

**PUBLIC-PRIVATE PARTNERSHIP IN URBAN DOMESTIC
WATER SUPPLY: A CASE STUDY OF JIMETA, YOLA
NORTH LOCAL GOVERNMENT AREA, ADAMAWA
STATE**

BY

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BEING

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DECLARATION

I declare that this work was carried out in its original form by ABDUL-WAHAB SHUAIBU PG/MURP/URP/04/0390 of the Department of Urban and Regional Planning, Federal University of Technology Yola, Nigeria.

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APPROVAL PAGE

This thesis entitled “Public-Private Partnership in Urban Domestic Water Supply: A Case Study of Jimeta, Yola North Local Government Area, Adamawa State” by ABDUL-WAHAB SHUAIBU PG/MURP/URP/04/0390 meets the regulations governing the award of degree of Masters in Urban and Regional Planning (MURP) Federal University of Technology, Yola and is approved for its contribution to knowledge and literary presentation

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TO

AISHATU
AMINATU
HALIMATU

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CHAPTER ONE

INTRODUCTION

1.1 Background Information

Water is one of the greatest necessities of human life. The supply of clean water is absolutely necessary for human life and health, yet 1.4 billion people lack access to safe water supply or can only obtain it at high prices (United Nations Centre for Human Settlement (UNCHS), 1998). Nigeria is a signatory to the United Nations International Drinking Water Supply and Sanitation Decade whose objective was to supply water to all citizens of the country between 1980 and 1990. In spite of the considerable investment of the Nigerian government over the years in this essential human requirement, a large proportion of the population still do not have access to water in adequate quantity and quality (Federal Ministry for Water Resources, 2000).

As contained in the Federal Republic of Nigerian Water Supply and Sanitation Interim Strategy Note (WSSISN) (2000), the Nigerian Government has long considered the provision of water to be in the domain of the federal, state and local governments. However, the public sector has not been successful in meeting more than a small proportion of the demand for water. Services are critically in short supply. Out of the 85 million people living in urban and semi-urban areas of Nigeria, less than half have reasonable access to reliable water supply (WSSISN, 2000). Many households, often the poorer, end up purchasing water from private vendors much more expensively than from the public supply (United Nations, 2000). Water services where they exist are unreliable and of low quality and are

not sustainable because of difficulties in management, operation and pricing as well as failure to recover costs. Many water supply systems show extensive deterioration and poor utilization of existing capacities, due to under-maintenance and lack of funds for operation (WSSISN, 2000).

To overcome this problem, the Federal government adopted a National Water Supply and Sanitation Policy in January, 2000. The policy seeks to supply sufficient portable water and improved sanitation to all Nigerians in an affordable and sustainable way through participatory investment by the three tiers of government, the private sector and the beneficiaries.

In most cities in developing countries, more than half the population gets basic water services from suppliers other than the incumbent official utility. Private entrepreneurs owned or manage water points, “kiosk,” pipelines, storage tanks and fillers. These suppliers make up the fastest growing category of water providers in Dhaka, Bangladesh; cover more than half of Nairobi, Kenya; and supplies a third of families in Addis Ababa, Ethiopia (Wegelin, 1999).

There is small-scale service provision experience in water supply in Nigeria. The use of small-scale services has resulted from necessity rather than deliberate policy. These experiences include intermediate and independent providers and domestic resellers. Private investors have provided boreholes and pumps, vending kiosk, and even some individual connections. Water vendors are present in virtually every Nigerian town (WSSISN, 2000).

The scenario in Jimeta is akin to what is obtainable in most Nigerian urban centres; preliminary investigation reveal that, the acute water shortages and

frequent brake-downs in supply have lead to the development of various alternatives. Privately developed water hydrants are common, and draw water from boreholes. Water is then pumped into tankers, which then supply designated locations – including low income neighbourhoods, factories and construction sites. Other modes of vending water include pushcart vendors, manual water carriers and large under-ground tank owners in neighbourhoods. Most of these operations are neighbourhood based and serve an internal clientele.

The private sector, inform of small-scale service providers have provided the bulk of the domestic water requirements of Jimeta residents. There has been a monumental increase in private sector investment in the water supply industry in the last few years, with only five (5) commercial bore-holes in 2000 to more than sixty (60) commercial boreholes in 2005 scattered all over Jimeta with highest concentration of eleven (11) bore-holes in Jambutu ward to cope with increasing demand. There is equally a corresponding increase in the number of commercial water tankers and push carts. The total private commercial investment in the water supply industry is worth more than N100 million (Abdul-Wahab, 2006).

These developments have brought about the need to investigate the capacity of the small-scale service providers and the partnering options available to enhance access to portable, affordable, and sustainable water supply. This study will use Yola North Local Government Area as a case study.

1.2 Statement of Problem

Jimeta, the headquarters of Yola North Local Government Area since its creation in 1996, is equally the administrative seat of the government of

Adamawa state. This dual status has been responsible for its growth in population and physical development, as well as its increased water demand. This increased demand coupled with the operations and maintenance problems of the Water Board has created water supply inadequacies in the town. This scenario prompted private sector initiative to fill the gap created. The performance of the private sector is indeed commendable. Studies have revealed that an average of 55% residents of Jimeta depends on commercial water providers for their domestic water supply (Naphthali, 2000; Abdullahi, 2001; Aliyu 2004 and Sadiq 2004). By September 2005 there were sixty four (64) commercial boreholes drilled by the private sector, in various parts of Jimeta to augment water being supplied by the water board (Field survey).

Attempts to study the contributions of actors in the water supply industry in Jimeta have not been all encompassing. While some studied the public water supply outfits (Naphthali, 2000; Abdullahi, 2001, Aliyu, 2004; Sadiq, 2004). Others were interested in the small-scale outfits (Abdul-Wahab, 2006; Hussain, 2006). There are still gaps to be filled, for instance, the capacity of the private sector as well as the strategies of involving the private sector in the main stream urban water supply outfit have not been looked at. These, if done will bring about the understanding of the capabilities of the private sector and ways of partnering in water provision for sustainability. This is the thrust of this research.

1.3 Aim

The aim of this study is to appraise the contribution of the small-scale water providers to urban water supply in Jimeta-Yola with a view to both deriving the urban development implications of their roles as well as proposing an appropriate public-private partnership option to enhance water supply in Jimeta-Yola, Adamawa State.

1.3.1 Objectives

The operational objectives to realise the aim are:

- a) To assess the performance of the Water Board in terms of access, regularity and adequacy of water supply to the residents of Jimeta and expenditure on water from the public source.
- b) To investigate the alternative sources of water used by households and appraise the contributions and cost of the private-commercial sources of domestic water supply in Jimeta.
- c) To identify the operational problems of the private commercial sources and suggest possible solutions.
- d) To identify urban development implications of the findings and make recommendations regarding appropriate policy and partnership frameworks for water supply in Yola, in view of the NWSSP 2000.

1.4 Research Questions

To generate an understanding of the capacity of the private sector and the viability of a public-private partnership in urban domestic water supply in Jimeta, this study will provide answers to the following questions:

- (a) How well is the Water Board in Jimeta performing in terms of adequacy and

regularity of water supply to the residents?

- (b) What is the magnitude of the contributions of the small-scale service providers to domestic water supply in Jimeta and how much is being paid for this services ?
- (c) What are the prospects and urban development implications of a public-private partnership in urban water supply in Jimeta?
- (d) What are the options for a synergy between the public and private sector?

1.5 Significance of the Study

The Ministerial Conference on Implementing UNCED Agenda 21 with regards to drinking water and sanitation held in Noordwijk (Netherlands) March 22-23 1994 stressed that, business as usual is not enough. It states that “to provide adequate services for un (der) served house holds, urban water supply programme need to be based on partnerships that involve public and private sector organisations” (UNHCS, 1998). In Uganda, reform of the urban water supply and sanitation sub-sector centres on the introduction of commercialised operations, chiefly through increased private sector participation. The sub-sector study recommended public-private partnership (Andy, 2002). In a good practice document compiled by Water Utility Partnership for Capacity Building (WUP) in Sub-Saharan Africa in 2003, majority of the good practices identified are spontaneous and demand- driven efforts promoted by small-scale providers and communities (Janelle, 2003).

Here in Nigeria, this realization is expressed in the National Water Supply and Sanitation Policy adopted by the Federal Government in January, 2000. This is in an attempt to increase water supply coverage and quality of service to the ever-growing population. As such, any concerted effort to study the contributions of the private

sector with the intention to improve water supply through the partnering approach is a step in the right direction. This study looked at the worth of the private sector in Jimeta, putting them to the fore as a stakeholder that needs to be strengthened.

It is envisaged that a collaborative approach between the private and the public sector will improve access to save domestic water. This implies less burden on people in terms of water collection, reduced burden on water-related diseases and the improvement of quality of life (UNCHS, 1998). It will also create new investment opportunities, reduce the budgetary allocation to the public water agencies, enhance productivity, as well as reduce poverty by reducing the amount spent on procuring water. Indeed, it will enhance the socio-economic well-being of the people (Adewale, 2001). The outcome of the study will be a useful reference material and will benefit all interested parties.

1.6 Scope of the Study

Partnership between the public and the small-scale service providers (intermediate and independent service providers) in some other parlance referred to as private informal service providers is the context of this study. It does not include national, international, multinational etc. water supply companies (concessionaires i.e private formal) as they are non-existing in the study area.

Jimeta-Yola is the geographical site to which the study will be particularly referred. Though other countries and cities will be mentioned within the realm of this presentation, the study will be particularly limited to Jimeta-Yola on empirical basis, other examples of places where partnerships to water supply is used will be on general basis.

1.7 Study Area

1.7.1 *Historical Perspective*

Yola was founded by Modibbo Adama in 1841 and had served as the Head Quarters of the pre-colonial emirate of Fombina. It has equally served as the seat of Adamawa province from the colonial era to 1976, when Gongola state was created and it became a capital city. However, with the local government reform of 1976, it became both the capital of the state and a local government (Mohammed, 1999). The colonial government in an attempt to establish the commercial importance of Yola, Jimeta town was established some eleven kilometres north of Yola on the southern bank of River Benue in 1912. The establishment of Jimeta as a port, administrative and commercial centre led to the emergence of Yola as a twin city, Jimeta-Yola or greater Yola. The cosmopolitan and heterogeneous Jimeta took in more immigrants and expanded at the expense of Yola, which still retains its traditional world view and outlook (Mohammed, 1999).

Yola was split into two local government councils with the creation of Yola North and Yola South local government councils in 1996. At the creation, Jimeta became the Head Quarters of Yola North local Government Area. It has been growing in population and physical development, commerce, industry etc. Jimeta is the administrative seat of the Government of Adamawa State. All the Ministries, Boards, Parastatals, State Secretariat, Federal Secretariat as well as Adamawa State government house are located in Jimeta. Although Jimeta is a cosmopolitan settlement with many tribes, the various wards are governed by

wards heads. The wards heads are answerable to the district head that is answerable to the Lamido of Adamawa (Amos, 2005).

1.7.2 Location and Size

Yola North is located roughly between latitude $9^{\circ} 14^1$, and longitude $12^{\circ} 38^1$ east of the Green witch Meridian, with altitude of about 185.9 above the sea level. It is bounded to the north by Girei local government area, to the south east, and west by Yola South Local Government Area. Covering an approximate landmass of 37, 000 square kilometre with a population density of 45 people per square kilometre (Tukur, 1999). Jimeta can be accessed through the Jos- Bauchi-Yola Federal road. From the north, it can be accessed through the Yola- Song-Gombi which provides access to the northern part extending up to Damaturu through Biu, gwoza and Bama areas to Maiduguri. Jimeta can be linked to Cameroon by both freight and passenger traffic through Yola- Jambilamba- Belel route (Galtima, 1999). Jimeta, presently consist of eleven (11) wards with differences in population and varying water needs, Table 1.

Table 1: A BREAKDOWN OF JIMETA INTO WARDS HOUSEHOLD AND WATER NEED

S/N	Ward	Number of household	Population	Water need million litres
1	Karewa	3632	29056	2324480
2	Nasarawo	2607	20856	1668480
3	Luggere	2330	18640	1491200
4	Rumde	1876	15008	1200640
5	Demsawo	1830	14640	1171200
6	Alkalawa	1808	14464	1157120
7	Yelwa	1736	13888	1111040
8	Doubeli	1698	13584	1086720
9	Ajiya	1491	11928	954240
10	Gwadabawa	1491	11928	954240
11	Limawa	871	6968	557440
Total		21370	170960	13676800

N:BThe estimates are based on 80 litres per capita per day, as the minimum requirement
Source: National Immunization Report 1999, Doubeli Clinic Jimeta, After Naphtali G. (2000).

1.7.3 Climate

Yola has a tropical climate marked by dry and rainy season. The rainy season commence in April and ends in October. The dry season starts in November and ends in April. The annual rainfall is less than 1000 mm. Between November and January, the whole of Adamawa state is under the influence of dry, continental and relatively stable air mass from the north-east (the hamatan) (Adebayo, 1999). Between January and March, relative humidity is extremely low (20/30%). There is a mean monthly sunshine hours of 56.8. The mean monthly temperature is 27.8^{0C}. The hottest month are March and April with temperatures getting up to 40^{0C}. While temperatures can be as low as 18^{0C} between December and January

1.7.4 Vegetation

There are two vegetation zones within Adamawa State, the south sub-Sudan and the Northern Guinea savannah zones. The sub-Sudan is marked by short grasses interspersed by short trees in the northern part of the state. To the south, the vegetation is marked with thick tall grasses and trees. This type covers greater part of the state within which Jimeta falls. The vegetation of the environment of Jimeta is secondary vegetation. This is due to mans action through construction; grazing, fuel wood gathering etc. have destroyed the natural vegetation (Akosim et al, 1999).

1.7.5 Geology

Adamawa State in general is a picturesque mountain land traversed by big river valley of Benue, Gongola, and Yeadsram. The valley of Cameroon, Mandara and Adamawa mountains form part of this undulating landscape (Tukur, 1999). Like most areas of northern Nigeria, the soil of Adamawa State is derived from basement complex, while few other places are on sand stones shales and alluvium. Basically, the Yola area consists of alluvial soil (Ray, 1999).

1.7.6 Population

The population of Yola north Local Government Area is projected to be 149,405 by 1999. This comprises of 75,293 females and 74,112 males. Uyanga (1999).The population of Jimeta alone was given as 120,555 in the 1991 population census. It should have over 300,000 persons by 2005 (Nwagboso and Uyanga, 1999). The population is made of people from all ethnic groups in Nigeria. However, the indigenous population is made up of Fulani, Laka, Bata, Vere and Hausa.

Jimeta is a civil service town although commerce is prominent. A large proportion of the population is engaged in fishing, farming, service industry, military and industrial activities. The cash crops produced include groundnut and rice. While the food crops are rice, maize, guinea corn, millet and cassava. A lot of dry season vegetable gardening is being undertaken at the Lake Gerio and Benue river bank (Amos, 2005).The service sector includes photography, barbing, hair dressing, motor mechanic, bicycle repair, tailoring and small scale food stuff trading, patent medicine sales, block making and building services. The local

industries include manufacturing of polythene bags, leather materials and sachet water. The Fulani are engaged in cattle rearing.

1.7.7 Infrastructure Facilities

Jimeta is served with communication networks and water supply and it is connected to the national electricity grid. Three types of banks are operational in Jimeta. These are commercial banks, the specialised bank and the central bank of Nigeria. There over fifteen commercial banks and four specialised banks in Jimeta. It also has over ten insurance companies (Amos, 2005).

Educational and Health facilities are also available in Jimeta. There are 36 primary schools, 10 post primary schools and 3 post secondary schools. There is government specialist's hospital, 69 health clinics and dispensaries (Bashir, 1999). Within Jimeta are some shopping complexes, hotels, sports facilities and cinema halls.

There is a public and private water supply infrastructure. There is the Jimeta water treatment plant and 42 boreholes scattered all over the town to boost the amount of water supplied from the treatment plant and to service areas without pipe network coverage in the public ownership. The small-scale providers have more than 64 commercial boreholes, 11 tankers and more than 3000 carts.

Water suppliers in the study area can broadly be classified into two:-

a. Government Agencies

Water Board: This is the State Water Agency responsible for supplying treated water to the consumers.

b. Small-Scale Providers

i. Independent Service Providers.

ii. Intermediate Service Providers.

Jimeta has an International Airport, Nigeria National Petroleum Corporation Depot, and in terms of Water transport, River Benue used to facilitate import and export into Adamawa region and transit to other areas.

1.7.8 Land Use Pattern

Categorically, there are 6 major land uses in the Jimeta metropolis and these include residential, administrative, industrial, institutional, commercial, recreational and others. Residential is the predominant land use in the urban land mass, with administrative, institutional, commercial, recreational, industrial and other land uses following in the order of ascending.

1.8 Definition of Terms

1.8.1 Small-Scale Service Providers (SSSP): A broad term that includes intermediate and independent providers.

1.8.2 Intermediate Service Providers: Describe service provided by those working as an extension of the utility or the independent providers (mediate between them and the end-user).

1.8.3 Independent Service Providers: Describe service provided by those working separately and in competition to the utility.

1.8.4 Private Sector: The same as small-scale Service providers.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed various authoritative views on domestic water supply. It chronicled the historical perspective to the present scenario. The chapter examined the resounding issues in urban domestic water provision which ultimately lead to the adoption of the NWSSP (2000), which endorses private sector participation and commercialisation of services.

To draw relevance and have a thorough understanding of private sector participation, partnership and partnering option have been reviewed, with case study of successful application. The chapter concludes by discussing the implications of the review for the study of private sector participation in urban domestic water supply.

2.2 Historical Perspectives

In the olden days, water was freely available in what was seen as virtually unlimited amounts. The sources of water supply in both urban and rural areas of Nigeria where wells, rivers, ponds, rain water, springs, reservoirs, and pipe born water (Idachaba, 1982; Bikan, 1995). These sources can be grouped into three: atmosphere, ground water, and surface water. All these sources may be used for community water supply, but each source has its specific implications such as accessibility, quality, quantity, and cost to draw the water and possibly treat it (UNCHS, 1998).

Amos (2005) reported that as far back as the 19th century (1806) the northern cities of what is today called Nigeria were highly organised and responsive to their needs. Early travellers recorded a high level of organisation in these cities. They noted the existence of (Quranic) schools and public utilities such as local and community maintained hand drawn wells. The northern cities were hierarchical in nature, starting from the wards, village, district, and Emirate. Although these cities were centralised and hierarchical in authority, local area heads remain in control of the daily activities at the community level. In south western Nigeria, the old Yoruba Empires of Oyo, Ife and Benin had similar organisational structure to those in the north. Traditional Yoruba culture had specific organisational system through which the basic infrastructure was provided through communal efforts. South Eastern Nigeria, in contrast, was populated mainly by dispersed rural communities; as such pre-colonial urban centres did not exist. However, within this rural community structure, communal labour was well developed. This shows that the community was responsible for its felt needs including water supply.

Public water supply started in Nigeria early last century in a few towns under the management of the lowest administrative level. Among the early beneficiaries of these facilities were Lagos, Calabar, Kano, Ibadan, Abeokuta, Ijebu Ode, and Enugu. The schemes were maintained with revenue from water rate collection with virtually no operational subvention from government. With the creation of regional government in the early 1950s the water supply undertaking continued to maintain the schemes but the financial and technical

responsibilities for developing new water schemes were taken over by the regional government. However, with growing demand and increasing cost, it became necessary for the regional governments to secure loans. The regions were requested to set up independent bodies' i.e. water corporations/Board to develop, operate, and manage the water supply undertakings. Hence, the first water corporation was formed in 1966 by the then western region with all the public water supply undertakings in the regions, including their staff, assets and liabilities taken over by the water corporation (FMWR, 2000). Today, all the 36 states of the federation and the federal capital territory have water boards/corporations or public utilities board managing their public water supply undertakings. Their efforts are supplemented in many cases by local governments who supply water to small villages in their areas of jurisdiction.

2.3 The Present Scenario

Households access water supply services through a broad range of service delivery arrangement (Fig. I).The nature of services available to them varies greatly from city to city. While in some urban centres utility or municipal services currently reach a majority of households e.g. Zaria (Ma'aruf, 2005).In others, private sector are the predominant service providers e.g. Minna and Wukari (Adewale 2001and Ishaku 2006).

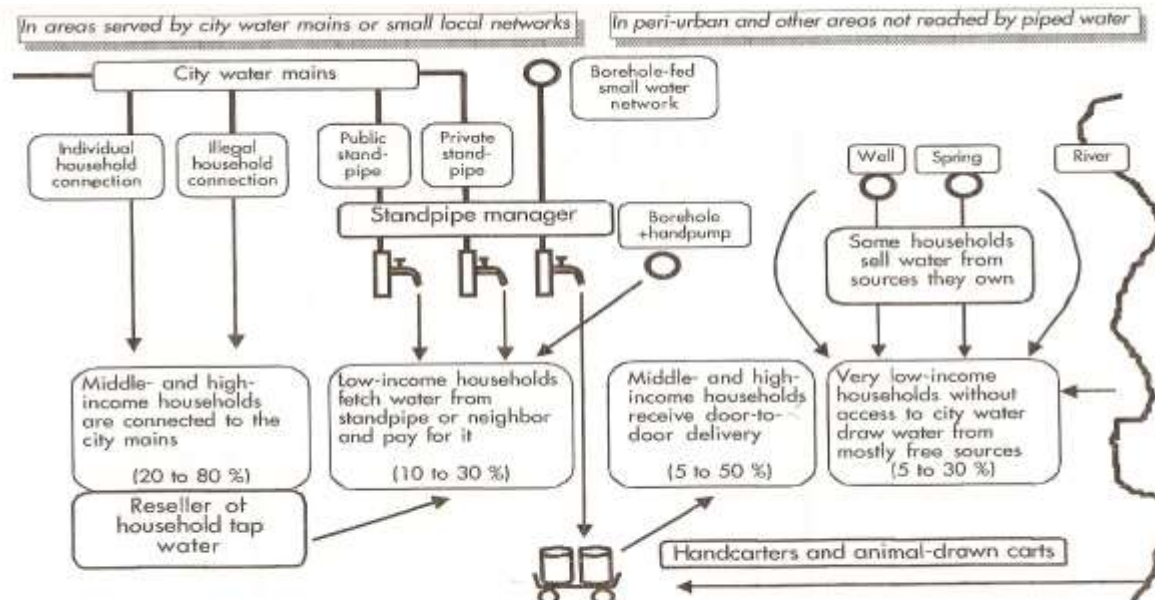


Figure 1: FROM SOURCE TO HOUSEHOLD: HOW THE WATER MARKET WORKS IN AFRICAN CITIES
Source: Collignon and Vezina (2000).

Nigeria is one of the signatory to the United Nations International Drinking Water and Sanitation Decade whose objective was to supply water to all citizens of the country between 1981 and 1990. In spite of the efforts of the various governments at all levels, the water supply coverage in the country appears to be decreasing and deteriorating (FMWR, 2000). Although many medium size and large urban areas in the country have public water works operating for several years, hardly any is performing efficiently. Most urban areas presently lack effective public supply systems that could ensure regular supplies to the population. The output from these systems meets only a small percentage of the water needs in the cities (Ayaode, 1981; Lee and Anas 1992). Ma'aruf (2002) in his own submissions added "extensive areas in many cities do not have any network connections".

The failure to develop efficient water supply systems has been established as a product of the interplay of several factors. One, is the enormous socio-economic rate of development which far outstrips the level of water supply development. Other factors include low investment level in operation and maintenance unrelated link between cost, price and consumption which account for frequent breakdown of the production facilities, and perhaps the most important is securing finance to build, maintain, and expand the systems (FMWR, 2000 and Ma'aruf, 2002). The availability of finance especially for day to day operations and maintenance is significant in view of the low level of public finance for urban development including water supply (Urban Age, 1993 and World Bank, 1994). The proliferation of alternative sources of water supply demonstrates the severity of the problem and the failure of the public water supply system to effectively respond to rising demand.

Dissatisfaction with these problems in the urban water supply sector has led to calls for drastic management and policy changes including partnering and outright privatisation of the service. Attempts to improve the situation by simply injecting funds and technical expertise actually create a contradictory situation of encouraging wastage and endangering sustainability (Ma'aruf, *op. cit.*).

Therefore, the situation of urban water supply as presently constituted is an unnecessary paradox, which can be avoided if bold decisions are taken to provide the service through appropriate partnership frame works.

2.4 Resounding Issues in Public Urban Water Supply System

2.4.1 *Funding*

The state governments fund water supply schemes through budgetary allocations to state water agencies. The funds are for capital projects, operation and maintenance. The state water agencies (SWAs) are expected to generate enough money through water rate collection at least for operation and maintenance. Invariably, they do not collect enough revenue because they have not been allowed to charge economic water rate by government (FMWR 2000). As reported earlier by Urban Age (1993) and the World Bank (1994) the failure to develop efficient water supply systems has been established as a product of the interplay of several factors. Among them, securing finance to build, maintain and expand the system is perhaps the most important. The availability of finance especially for day to day operations and maintenance is significant in view of the low level of public finance for urban development including water supply.

Timothy (1998) submitted that municipalities in developing countries face critical problems in financing infrastructure projects to meet rising demand for services because of the traditionally exclusive domain of the public sector. But a number of factors have lead governments to consider private participation in the financing, operations, and management of water services. He added that, as cities consider financing options, including those practice in industrialised countries, policy makers must first make a fundamental decision regarding ownership and responsibility of providing infrastructure services. In the same vein, Suresh (2005) talking about the Indian experience in water supply lamented that while provision

of water supply in cities and towns remain the primary responsibility of the Urban Local Bodies (ULBs). The financial base of the ULBs over the last four decades has become increasingly fragile and the ULBs are finding it difficult to maintain even the existing lower level of water supply services. The failure on the part of the local bodies to collect adequate revenues from tax sources has made them increasingly dependent on the State government for funds. Urban water supply in Nigeria most vividly reflects this situation.

Urban water supply in most developing countries is commonly undertaken by government Parastatals that have the dual objective of providing a social service while generating revenue to offset costs. These are common with most Parastatals, and the problems encountered are typical. Problems like absence of clear institutional objectives; Low wages and poor equipments and supplies have been widely cited as the typical institutional characteristics of water supply agencies in Nigeria (Falana, 1991 and Yakubu 1995). Similar situations have been reported in other developing countries (World Bank, 1994; Franceys, 1994).

Their effect is to entrench a vicious cycle that constraints the generation and effective use of finance to improve performance. Performance assessment of these institutions typically reveals weakness including low output performance, ineffective delivery system and poor financial portfolio (Ma'aruf, op. cit).

2.4.2 Tariff Structure

Cost recovery in the urban water sector varies widely across developing countries. Some countries manage to recover all operating and maintenance costs, plus a significant portion of capital costs. Others average less than 30-40%

recovery of operation and maintenance costs alone (USAID, 2001). In designing tariff structure for water consumption, the goals of economic efficiency, costs recovery and financial self sufficiency for the supplying institution and equity for consumers of different income levels often come into conflict. There is no universally preferred tariff structure. There are, however, clearly bad tariff systems. Charging all household a uniform monthly amount for water usage, without metering consumption or differentiating by the level of service violates most of the objectives of a pricing system (Suresh, 2005).

The pricing mechanism is rarely used to guide the decision of the consumer, as to how much to consume or to balance supply with demand. The existing water connection charges and water tariff have remained indifferent to the inflation rate. Quite often, the state government being the guarantors of loans received from the financial institutions for implementation of water supply systems, come to the rescue of the state level agencies for repayment of loans and water tariff structures intended to be revised remains untouched due to various socio-economic and political reasons (Timothy, 1998).

2.4.3 *Accessibility*

Ma'aruf (2005) in a study of urban Zaria reported that of the 63% households connected to public water supply only 49% have active connections that is, connections that are operational. The percentage of households connected to public water supply in Minna as reported by Adewale (2001) is not as impressive as that of Zaria as only about 22% of households had connections. The situation in Yola is between that of Zaria and Minna. About 46% of household in

Yola are connected to public water supply (Naphtali, 2000). In response to the question why they are not presently connected, three categories of responses were recorded. These are satisfaction with alternative sources, perceived poor quality of supply from the public system and the cost of initial connection. A substantial number of households do not have direct access to the system. Ineffective service delivery has also meant that those that are connected can not rely on it due to inadequacy. The non active connections have been disconnected by the water boards for non payment of bills. In turn, most of such households have refused to renew their connections apparently in reaction to the poor services. For those having connections, the reported water availability is for an average of 11 days in a month, lasting for a few hours on most occasions (Ma'aruf, 2005).

In the three reported cases above, households utilise different sources of water supply to either augment, or as an alternative to the supply from the water board. Purchase of water from vendors was among the most frequently sited source especially during the dry season. It is also significant that most household have access to private wells that supply water for most of the wet season. Other sources include rain harvesting and the use of neighbours and community wells, especially where they remain productive throughout the year.

USAID (2001) looked at improving accessibility from the perspective of redefining standards and involving the public. It asserts that the United Nations and WHO minimally acceptable water access standard consist of having a source of abundant and safe drinking water within 200 meters. This standard implies that stand pipes and outside water connections can be part of the solutions, especially

in high density low income areas where the alternative is expensive and unsafe water delivered by water vendors or no water supply at all. A majority of developing countries, however, have been unwilling to incorporate such reduced standards in their urban planning. The result has been a publicly endorsed “right” to inside the house public water supply, which many residents in fact do not receive, leading to frustration, resentment and illegal connections. To address these issues USAID is of the view that, public authorities faced the policy challenge of defining the standard of water service that meets critical health objectives, is financially sustainable within the resources available to families and the public water supplier, and yet is acceptable to the community. That, public participation in water supply decisions is equally part of the solution. Once households recognised how their cost of water supply will differ with varying types of services, community members can often agree on the preferred type of service for their neighbourhood.

2.4.4 *Sustainability*

Sustainability as a concept is based on equity between intra and inter-generational equity issues. The intra-generational issues deal with distribution of infrastructure democratically so that all users derive economic benefit from the infrastructure. Inter-generational issues involve the utilization of resources at the present time without destroying future prospects (WCED, 1987; Agunwamba, 1993).

Agunwamba (1993) in his work poverty, sustainable development and environmental technology see sustainability in terms of water supply to involve

affordability, appropriateness, environmental friendliness, and functionality. These he said should be accompanied with community participation. In his own contributions Magaji (1999) highlighted the reasons of un-sustainability in water supply to include uncoordinated water supply programme, inadequate feasibility studies before location of bore holes, un-planned maintenance programme and long down time. That is, period of break down. He added that most government agencies being sectoral instead holistic in their approach have often ignored the link between sustainable development and human behaviour. Sustained public enlightenment to educate the public on water conservation so as to curtail wasteful practices, better catchment practices so as to preserve water quality, and the right use of public facilities have not been pursued vigorously (Agunwamba, 1995). Duru (1991) identified appalling apathy towards public projects coupled with prevalent but devastating misconception that water is a free unlimited gift as another dimension to the problem. This he said, apart from exacerbating low efficiency and productivity stifles innovation and encourages mediocrity and high labour mobility.

The Adamawa state water board in its December 2005 monthly report itemised the factors inhibiting improved and sustained water supply to include:

- (a) Poor financial status of the board,
- (b) The continuance of poor staff strength for maintenance activities,
- (c) Absence of regular maintenance and consequent higher operation and maintenance cost,
- (d) Unrelated link between cost, price and consumption,

- (e) Substantial losses and leakages (40%), and
- (f) Irregularity of power supply.

Suresh (2005) reported that, the Habitat II conference at Istanbul has given a clear vision on the essential requirements that needs to be adhered to, to achieve the goal of water for all. It urges the governments at appropriate levels in partnership with other interested parties, to ensure that clean water is available and accessible to all human settlements. It recognises that water resource management in human settlements presents an outstanding challenge for sustainable development which combines the challenge of securing for all the basic human need for a reliable supply of safe drinking water and meeting the competing demands of industry and agriculture, which are crucial to economic development and food security, without compromising the ability of future generations to meet their needs.

In recognition of such concerns, the Federal Government of Nigeria has taken a step in the right direction by adopting the NWSSP (2000) which seeks to achieve sustainable water supply in Nigeria.

2.5 Partnership

The Encyclopedia Americana (2003) defined partnership as applied in law terms as an organisation of two or more persons who agreed to combine their labour, property, and skill, or some or all of them, for the purpose of engaging in lawful business and sharing profit and losses between them. The parties forming such an association are known as partners.

Shaw (2002) stated that partnership aim at demonstrating how service providers, recipient of service and related stake holders can work together to put communities at the centre of development and deliver real and sustainable benefits for all. This suggests that government alone can not provide all the needed urban services for its citizens. The dependency syndrome that has characterised our societies should be avoided at all cost. No community should sit back and expect the government to do everything for them (Bloxon, 2003).

2.5.1 *Partners in Public- Private Partnerships*

In their works, Dillinger (1994), Shbeler (1995), Wegeling (1996), and Arrais (1996) were unanimous in their identification of stake holders in a public-private partnership and highlighted who these stake holders are their individual responsibilities and what such partnership aim to achieve. They reported that, under the broad concept of public private partnership, public authorities that is, municipalities and other government agencies, create the opportunities for private organisations to establish, operate and manage local water supply services. The aim is to create efficient, effective and equitable services for low income urban areas, which operate well and are generally affordable and used.

2.5.2.1 The Public (Governmental) Agencies:

The provision, operation and maintenance of urban infrastructure services are usually the responsibility of municipal authority. Wegelin (1995) makes a distinction between technical agencies/department/utilities and local political authorities responsible for overall urban management and development and politically accountable to the public.

The main interest of the technical agencies is to keep the service functioning in the key parts of the city. As such they are less concerned with provision of service to low income areas as the revenues for these services often do not cover operational cost and the tax base in this area is low. Moreover, in many cities municipal regulations do not allow the agencies to extend services to areas considered illegal.

The responsibility of municipal authorities is broader than that of technical agencies, encompassing all infrastructure sectors, social services and general urban economic and spatial development. Their powers may range very widely from being directly controlled by central government to relatively autonomous bodies which control their budgets and have full political autonomy (Dillinger, 1994).

2.5.2.2 The Private Sector:

Within the private sector a distinction can be made between Intermediate and Independent service providers. Intermediate Service providers typically include private providers or community based organisations delivering water in unserved areas. Intermediate providers generally obtain water from the network and either install and manage network extensions or water points in unserved or poorly served areas; or buy and deliver water directly to customers willing to pay them (Janelle, 2003). Carriers or non-network providers might include water tankers, horse/donkey-carts, push carts and hand carts. The common characteristic of these intermediate service providers is that they purchase water in bulk from the utility or independent supplier and retail to a group of their own customers.

Independent service providers are distinct from intermediate service providers because they are not connected to the utility network and may even compete with it. They generally derive water from alternative sources such as boreholes and then distribute via a network, through a carrier or simply through a single supply point. As they compete with the utility within its service area, many independent providers operate illegally and are unregulated (Janelle, op cit). As distinct from intermediate service providers, they may not have any link with the utility and the utility may see them as a competitor and actively work against them. Today in cities such as Dakar, Bamako, Ouagadougou and Kampala city-wide utilities contracts with private operators (Collignon and Vezina, 2000).

Libby (2000) outlined the reasons for the involvement of the private sector in a hitherto exclusive domain of the government. He reported that, traditionally, the provision of water supply services in developing countries has been the responsibility of government. Substantial private sector involvement was considered inappropriate giving the public good and basic need characteristics of water, and the monopolistic tendencies of the sector.

However, in recent years, there has been a large increase in private sector participation (PSP) in the provision of water supply, largely driven by the desperate need for increased capital investment. In the majority of developing countries, rapidly growing populations, a reduction in assistance for water supply from international development agencies and severely constrained public sources of finance have all contributed to making it increasingly difficult for the government to bear the cost of system rehabilitation and expansion. In addition to

the need for capital, the motivation for PSP has been driven by a belief that private sector providers may be more efficient, reducing cost and increasing service quality and coverage.

2.6 Potentials in Private Sector Participation

The main advantage of the SSPs are their ability to respond quickly to changes in demand, to offer services needed by the low-income families, to self finance, and to recover all costs (Collignon and Vezina, 2000).

Tova (1998) made a case for small-scaled water entrepreneurs. He stressed their ability in meeting unserved niches of the water supply market. Using instances, their viability, efficiency and flexibility was exhibited. His submissions are in the following paragraphs.

Historically, utility companies emerged to take sole command of water supply in U.S. and European cities for two main reasons: to guarantee uniform water quality and to provide pressure points for fire preventions and control. As this model has been officially adopted in developing countries and promoted as a public or private monopoly, the multiple small scale providers have dropped out of the lexicon. The arguments based on economic of scale or natural monopoly in water provision have often meant that small informal suppliers were ignored, outlawed or regarded as a stock gap and sub-optimal by policy makers.

In reality small scale operators tend to be customer-driven, financially viable, and ready to apply innovative technologies and marketing methods. They provide appropriate solutions in appropriate places, assume all investment risk

and reach the poor. They charged market prices, cover cost and respect willingness to pay.

2.6.1 *Efficiency*

Tova (1998) accepts that, the operational efficiency of small scale operators compares well with the large scale suppliers. In a study of Haiti and four West African countries he reported virtually no water losses among the private providers and an employee client ratio of 1 to 500, figures that any utility company will envy. The study in Guatemala compared two private aqueduct and sanitation systems with state water company and found that investment cost per new consumer were 20% and 60% lower for the small scale private companies than for the state utility, operating cost 72% and 77% lower, administrative cost 92% and 99% lower. The ratio of income to expenses was 1.18 and 1.37 for small scale operators, compared with 1.47 for public company.

2.6.2 *Viability*

Talking about viability, Tova (1998) submitted that small private water businesses are profitable, unlike most single source utilities, which seem to need a critical mass of high income clients to make a profit. The study of Haiti and four West African countries reported earlier on found that of 25 municipal companies reviewed, only those in cities of more than 100,000 people were operating in the black. And while the official water companies enjoyed monopoly right to serve in these cities, they reached no more than 65% of the population, leaving the private small scale sector to cover the low income families.

2.6.3 Flexibility

There flexibility Tova (1998) asserts is because they are basically independent of public water suppliers, although many work in partnership with state companies, purchasing water from them for distribution. And the public sector may depend on private distributors to reach some neighbourhoods. In Port-au-Prince, Haiti, small scale entrepreneurs produce about 10% of the water supplied, distribute about 20% of the city's water and reach some 70% of the house holds.

Independent water companies are not necessary limited to places with ground water. Almost all of Yemen's urban population and about a quarter of Lima's depends on small scale private companies for water supply, despite the difficulties of finding ground water. Nor a private water system limited to a particular income group. They regularly serve the rich as well as the poor. In Asuncion, Dakar, Barranquilla (Colombia), and urban Yeman small scale water providers reach middle income families as well as house holds at the extreme ends of the income distribution scale (Tova, 1998).

2.7 Models of Private Sector Participation

According to habitat debate 2003, urban water and sanitation are never sold off to private enterprises to use as they see fit. But there are several models of private sector participation and many variations, depending on the legal and regulatory frameworks, the nature of the company and the type of the contract. But that in all the models regardless of the level of private sector involvement, the

public sector role and regulatory environment are critical. The partnerships directly related to this study can take either of the following modes:

2.7.1 Service Contracts

These are usually short term agreement where by a private contractor takes responsibility for a specific task, such as installing meters, repairing pipes or collecting bills.

2.7.2 Management Contract

Under this arrangement, the government transfers the responsibility for the operation and maintenance of water or sewerage network to a private company.

2.7.3 Affermage Contract

This is similar to management contract, but aside of the operations and maintenance responsibility technical and commercial responsibility is added.

2.7.4 Lease Contract

A lease contract is similar to affermage contract, except that the revenue is determined solely by tariffs.

2.7.5 Concession Contract

Under this arrangement, the private contractor manages the whole utility at its own commercial risk.

2.7.6 Build Operate and Transfer Contracts

These are similar to concession contracts with the difference that the private contractor is responsible for constructing the infrastructure from the scratch.

2.7.7 Full Privatization

Here a private company purchases the utility from government and takes over its operation and maintenance as a business on a permanent basis, but under strict commercial rules.

2.8 Constraints of Small Scale Service Providers in Service Provision

Several recent studies have highlighted the important role being played by SSP in the provision of water supply and sanitation services especially in the urban areas (Collington and Vezina 2000). However, the good practice document compiled by WUP (op cit.) and a full report of a ten country study conducted by water and sanitation program (op cit.) identified institutional arrangement, legal and policy, resource issues, and urban development policy issues as the key problems militating against small-scale service provision and expansion.

2.8.1 Institutional Arrangement

Lack of recognition of the contributions of SSPs by the authorities and reluctance to use alternative approaches to service delivery.

2.8.1.1 Lack of Communication with Authorities:

This silence is due in part to the lack of professional associations to represents the SSPs and lack of interest on the part of the authorities. They turn a blind eye to the presence of SSPs. For the lack of any official recognition or status, SSPs may be subject to abuse by government officials who may impose fines. In addition to increasing cost, this type of unwarranted interference increase risk and discourage investment.

2.8.2 *Legal and Policy*

Lack of adequate policy to address SSP issues and lack of clear regulatory framework.

2.8.2.1 Lack of independent Regulatory Authority:

The regulatory agency must be truly independent in status and in practice, since it must be able to balance the divergent interest of different parties, especially in the case of a conflict between public authorities and private operators. Some public authorities make point of testing the quality of water distributed by independent providers but rarely test water distributed in the city-wide mains. Some public authorities would like to put a ceiling on the price of water but have no intention of subsidising the difference between the maximum price and the cost of providing water.

2.8.3 *Resources*

Insufficient funds, lack of targeted financing from government, heavy taxation and lack of framework for including funding from philanthropists.

2.8.3.1 Nature of Demand for Finance:

Most SSPs meet their working capital requirements through user charges. However, the lack of access to credit for capital investment is often one of the main constraints to new entry and expansion of service by SSPs. Thus, potential demand for finance is mainly for capital investments, either at entry level or for expansion and augmentation after an initial period of operation (Mehta and Virjee 2002). Table 2 show illustrative entry cost associated with different types of SSPs. In most cases the SSPs rely on their own savings and borrowing from friends and

relatives. Depending on the level of initial investment, lack of access to credit inhibits new entry and can therefore limit competition. The modern banking sector does not offer loans to small individuals operators. SSPs are therefore obliged to finance their investment through more traditional means (family savings, saving clubs (tontines), money lenders etc). Because there is no means to share risk when using traditional financing sources, SSPs tend to make a number of sequential smaller investment rather than take advantage of economies of scale.

Table 2: EXAMPLES OF INVESTMENTS MADE BY INDEPENDENT WATER PROVIDERS IN AFRICAN CITIES

Type of Investment	Usual source of finance	Cities	Unit cost (US \$)	Asset Life (Years)	Cost/annual earnings ratio
Handcart	Own and family savings	Ouagadougou	50	5	6%
		Bamako	120	10	10%
		Nouakchott	135	10	9%
Donkey-drawn cart	Own and family savings	Nouakchott	150	1	10%
Water truck	Formal or informal loan and earnings from other activities	Nouakchott	15,000	10	48%
		Nairobi	13,000	5	19%
		Kampala	7,500	10	13%
Standpipe	Own and family savings	Ouagadougou	50	5	1%
		Dakar	700	10	20%
		Nouakchott	700	10	50%
Overhead water tank to fill trucks	Own and family savings	Kampala	2,000	5	11%
Private borehole + standpipe	Bank loan	Nairobi	37,400	16	82%
Small network with standpipes	NGO loan	Conakry	12,500	10	58%
	Own and family savings	Cotonou	1,500	5	27%
Autonomous standpipe	NGO financed	Ouagadougou	15,000	20	500%
Small network w/ metered household connections	User subscription costs	Guerou (Mauritania)	3,000 (per km)	25	300%

SOURCE: Collingnon and Vezina (2000)

2.8.4 Urban Development Policy Vacuum

The capital cities of sub-Saharan African countries have been growing at annual rates of 5 to 8 % over the last 30 years, a rate of growth that implies rapid and continual responds to the growing demand for public services. But there is a consistent absence of public policy to deal with urban growth in all these countries. The lack of any clear strategy for extending infrastructure and developing new lands has led to mushrooming of unplanned settlements and of illegal ones on lands difficult to provide with basic infrastructure (areas subject to flooding, ravines, lanes impassable to motorised vehicles). While this situation has created opportunities for SSPs, who can more easily provide water in such areas than the public outfit; it also has raised the cost of delivering such service.

2.9 The Role of Public in the Partnership

Regardless of the level of private sector involvement, the public sector role and the regulatory environment are critical (Cecilia et al, 2004). The UN-Habitat (2003) re-defined the role of the government in a public private partnership in the points below:

Commercialisation/privatisation of water has in no way diminished the public role in the sector. This role is shifting from the sole-provider to enabler, with an emphasis on the ability to act as;

- (a) Regulator, monitoring service quality, ensuring equitable access and limited monopolistic pricing.
- (b) Catalyst, providing incentives and streamlining procedure and regulations.

- (c) Partner contributing finance directly or through incentives and credit enhancement.

2.10 Case Studies

Below are a few examples and analysis of the experiences of small and medium size operators in water supply.

2.10.1 Benin

Societe Beninoise d l'Eau et de l'Electricite (SBEE). Benin provides a case where collaboration between the central utility, SBEE, and independent resellers has led to increased service coverage where government did not have the funding to expand service to the entire population. Small-scale providers enter into agreement with SBEE, and fall into one of three categories: metered rural groups, urban groups or urban resellers at standpipes. In order to become a supplier of water, a small-scale provider submits an application to SBEE for a connection. The new operator then pays a connection fee and a water tariff of US\$ 0.5 m³ for the water sold. Given the formal legitimacy of the SSP franchise, operators are able to access finance facilities. Microfinance institutions offer loans to operators to extend their networks or invest in other capital. L'Association de Revendeurs d'Eau du Benin (AREB) was formed in 1999 and has over 150 members in the Cotonou area. Members have over 20 years experience in selling water.

2.10.2 Tanzania

In Tanzania, district governments are the owners of their water sources and infrastructure. They co-finance, with the help of the central government, the

construction of infrastructure. The water supplies are supervised by Water and Sanitation Board, which come under the district government. These boards contract out the actual management of the services to private companies, some of which employ paid staff and use external auditors.

In this institutional structure, there are three types of contracts, linking the four partners involved: Firstly, the district and the ministry responsible for water signs a memorandum of understanding stipulating the co-financing arrangements. Secondly, the district creates by decree the water authority (Water and Sanitation Board). A performance contract indicates the tariff policy and the level of service to be guaranteed. Finally, the Water and Sanitation Board selects, through tender an operator which signs a management contract.

2.10.3 Niger

Private operators in Niger have become active in several ways. Sector policy in Niger now favours the contracting of water services to private operators.

Three types of contract coexist in the country:

Formalising Local Initiatives: A Nigerian company, SONEXIE now manages the water supplies in six centres in the north of Niger. SONEXIE started when its current director was told by the local chief in one village that the water supply had broken down and there was no project to assist them. He then worked with other local entrepreneurs to repair and replace some of the equipments. The situation reoccurred in other places. To formalise their investment in this growing market, the group founded SONEXIE as a company. It depends on economies of scale, even if in certain cases the selling price of water of water have to be reduced.

In order to make the agreement signed by the community leaders official, the ministry responsible for water devised a tripartite contract between the ministry, local government and the contractor. These contracts set the price of water. In all cases the assets remained the property of the state but because the company had finance the rehabilitation work, it was entrusted with managing the water services for a fairly long period of time (five to six years).

Tendering For Competition: Following an invitation for tenders for the operation of water supply in eight centres, many bidders expressed their interest, among them were independent operators. The contracts were signed with six successful bidders. The contracts stipulate that 30% of the turn over be deposited in a bank account for the renewal of infrastructure, 68% goes to the operator to cover its operating cost, 1% to user association, and another 1% to the financial audit of the operation.

Entering Into a Large Contract With a Multinational Company: The government felt that a single large contract was the appropriate method to serve the largest towns and cities, so in June 2001, the Niger National Water Company (SPEN), contracted to Vivendi the operations of water services in the capital Niamey and 50 centers, the smallest of which had 10,000 inhabitants.

2.10.4 Uganda

Under the Ugandan government sectoral reform and decentralisation Programme, the district government favours contracting management of several town water supplies to a single operator. Following an invitation for tenders, the ministry responsible for water concluded management contracts with two

Ugandan private operators. KALEBU Ltd has the contract to supply water to five towns with an average population of 40,000 whose number of private connections varied from 170 to 250. The system functions independently of each other, with a team of about six employees per centre. Their accounting methods and procedures are identical. The technical results are encouraging, with a billing rate that has reached 98% and a recovery rate in the other of 90% of the amount due

2.11 Lessons from the Cases Reviewed

The case study from the several African countries shows that SSSP does not only present a viable option to the water utilities, but can as well partner with the water utilities. In Niger, a medium-sized private company has financed the rehabilitation of a particular small-town water supply and has taken over their operation without any external financial support. In Benin, Tanzania, Uganda and part of Niger, small private sector companies have won tenders to manage or lease water systems.

The case studies demonstrated a wide range of institutional arrangements. They show the flexibility and dynamism of small and medium sized water organisations across Africa. In all cases, the decisions on institutional arrangements rest with the local or national government. The operators generally aim to increase the number of private connections in order to offset their fixed cost against a large volume of water sold and hence reduce the price to consumers. They can achieve economies of scale and with appropriate support and regulation they can provide good water services.

2.12 Policy Statement

As contained in WSSISN (2000), the Nigerian government has long considered the provision of water supply to be the domain of the Federal, State and Local governments. However, the public sector has not been successful in meeting more than a small proportion of the demand for water. The public sector is incapacitated in sufficient portable water supply with only 42% of the inhabitants of the urban area having access to portable water supply, and a national average of 32% litres per person per day urban delivery (NWSSP, 2000). To overcome this problem, the federal government adopted a National Water Supply and Sanitation Policy in January, 2000. The policy seeks to supply sufficient portable water and sanitation to all Nigerians in an affordable and sustainable way through participatory investment by the three tiers of government, the private sector and the beneficiaries.

The private sector has not been identified as a major player in the sector although their contributions are recognised (NWSSIS, 2000). The funding principles for capital projects as contained in NWSSP (2000) do not reflect the major stake holder status of the private sector. The private sector is equally missing as a policy instrument for the operation of the water supply policy (Abdul-Wahab, 2006).

The United Nations World Water Development Report (2000) shows that, Nigeria is in tune with global need for new policy approaches. It reported that, partnerships between different stake holders are stressed in most new policy approaches, with the recognition that solutions to water problems can not be

achieved by one organisation or even one segment of the society. Indeed, changing institutional mandate is central to new water policies and laws around the world. These issues have to be addressed for effective private sector participation.

2.13 Implications of the Review for Domestic Water Provision in Jimeta

Each of the sections of this review has profound implications for the study on private sector involvement in urban water provision in Jimeta. From the review, it can be seen that, even before the coming of colonial masters to what is today called Nigeria, communities were highly organised and responsible for their felt needs including water supply. Water supply was exclusively under taken by the community. This was in form of local and community maintained hand drawn wells. It was early this century that public water supply started in Nigeria, and before now, it was almost the exclusive domain of the public outfits, especially in the urban areas. Although there are some private sector participation experiences in urban water supply in Nigeria, the use of private services has resulted from necessity (the failure of the public outfits) rather than deliberate policy. The proliferation of commercial water supply outfits and the NWSSP (2000) now in place has demonstrated the acceptance of private sector participation as efficient, viable, and flexible medium for enhancing water supply.

The section on resounding issues in urban water supply highlighted the recurring issues that have bedevilled the public water supply outfits thereby hindering sustainability. The constraints militating against effective small-scale service provision have also been identified. This implies that, a public-private

partnership in domestic water provision in the study area is a panacea for effective service delivery only when it is able to address these issues.

The changing role of the government as highlighted by UN-Habitat (2000), from sole supplier of water to enabler; acting as regulator, a catalyst and a partner is a manifestation of a paradigm shift from the monolithic solution of a city-wide piped network run by a single monopolistic operator, to recognising and understanding the role private sector has been playing in water services provision. This has led to a rethinking about the need for “a new approach” to domestic water supply in the study area.

Finally, the section on partnership implied how the public and the private sector in the study area can work together to provide portable and sustainable domestic water. This is demonstrated by case studies of successful partnerships elsewhere.

2.14 Summary

From the review it is seen that public Water supply schemes started early last century. However, most of the urban areas presently lack effective public supply system that could ensure regular supply to the population. This failure has been established as a product of the enormous socio-economic rate of development which far outstrips the level of water supply development. This is as a result of what Ma’aruf (2005) called internal management factors (organisational mission, values and objectives, autonomy, staffing, finance etc) and external influences (government policy, societal values etc).

It has been shown that dissatisfaction with these problems in the urban water supply sector has led to calls for drastic management and policy changes including partnering and outright privatisation of the services. In recognition of such concerns, the Federal Government of Nigeria has adopted the NWSSP (2000) which endorses private sector participation as well as commercialisation of water services. Despite their potentials and the important role the private sector is already playing in augmenting water supply service as shown in the review, the institutional, legal, regulatory and policy issues that is shown to constraint small scale service provision needs to be addressed for the outfit to effectively participate and contribute. After promoting the course of small scale service provision of water, the review finally revealed some useful implication of that for public private partnership in Urban Domestic Water Provision in Jimeta.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the method employed in going about the research is reported. It starts by describing the type of data the research needs, their sources and how they will be collected. It also describes the instruments used in gathering and analysing as well as the procedure for collecting and analysing the data obtained.

3.2 Data Required

Data required for this study includes population of the study area; water requirement standards; water supply quantity via the state water board; water supply quantity from alternative sources; location of water treatment plants, boreholes, rivers etc.

For an understanding of the intricacies of urban domestic water supply, published and unpublished authoritative views are required. In addition to the review of relevant literature, the views of the water board, and the small-scale service providers on different aspects of their operations were obtained.

Other forms of data required, pertains to sustainability issues in water supply. Data is therefore required on partnership and private sector participation. To this end, the NWSSP (2000), partnership and partnering case studies were reviewed.

3.3 Research Design

The research design chosen for this study is the survey research. This design was chosen because survey studies are mainly used to document the nature, scope, dimension and direction of events, behaviour and attitudes about persons or things. Since this study requires collecting data on the state of water supply, actors in water supply, problems of water supply and solutions to the problems, it thus qualifies to be investigated as a survey research.

3.4 Sources of Data

Data required was sourced from the following primary and secondary sources.

3.4.1 Primary Data

Data collected directly by the researcher from administered questionnaires, oral interviews and observations fall under primary data. These were collected from the state ministry for water resources which comprises of the Head Quarters, Rural Water Supply and Sanitation agency, Small Towns Water Supply and Sanitation Programme, the Water Board, and the Small Scale Service Providers.

3.4.2 Secondary Data

The secondary data was sourced from published and unpublished materials, maps, text books, journals, magazines, relevant documents and seminar papers; this equipped the researcher with the theoretical background of the subject matter.

3.4 Population and Sample

Naphtali (2000) reported that, there are about 21370 house holds in Jimeta by 1999. Projected to 2007 at 3% annual growth rate it becomes 27071. This represents the population of this research on household survey. 379 households is the sample (appendix IV) at 5 percent level of significance (William 1977, Odekunle, 2005). Interestingly, Jimeta has been stratified into wards; these wards were taken as strata. The sample was drawn in proportion to the number of house holds in each stratum (See appendix V and Table 3). This formed the basic unit of analysis for that aspect of this study on household survey.

For the private sector, there are about 64 independent water providers, about 1500 truck pushers and 12 water tankers (Field survey 2006). 86 % coverage of the independent water providers, which is about 55, is design as the sample. The sample was drawn in proportion to the number of independent water outfits in each of the 11 wards of the study area. 20% (i.e 300) will be sample size for the truck pushers, while 10 for tanker drivers. These sample sizes are arrived at as in the preceding paragraph. The Water Board is the public water supplier; apart from the Jimeta treatment plant, it has 42 other

Table 3: PROJECTED NUMBER OF HOUSE HOLDS AND SAMPLE SIZE

S/N	Ward	Number of Household	Sample Size
1	Karewa	4601	64
2	Nasarawo	3303	46
3	Luggere	2952	44
4	Rumde	2376	33
5	Demsawo	2318	32
6	Alkalawa	2290	32
7	Yelwa	2199	31
8	Doubeli	2151	31
9	Ajiya	1889	27
10	Gwadabawa	1889	25
11	Limawa	1103	15
Total		27071	380

Source: Author, 2007

boreholes scattered across Jimeta of which 4 are abandoned. 50% of the 38 functional ones (i.e.19) was chosen as the sample. It was drowned in proportion to the number of boreholes in each of the 11 wards of the study area. Four out of six assistant general managers as well as 19 operations staff of the board were interviewed.

3.5 Data Collection Instrument

Questionnaire and oral interview guide constitute relevant instruments for the collection of relevant data for this research. A questionnaire addressed to the household heads was employed to solicit the information required. The questionnaire contained questions on the household's characteristics, water supply status, alternative sources of water and expenditure on water supply. The questionnaire was administered by interview method and was validated through a pilot survey. In multiple household units (compounds), a single household were

selected randomly but preference was given to households whose heads were available at the time of the interview.

The questionnaires were administered to Jimeta residence, operations and management staff of the Jimeta Water Board, small-scale water suppliers and the management staff of the state ministry for water resources. Appendix I tagged Jimeta household survey was administered to Jimeta residence. It has two sections A and B. Section A asked questions on household and housing characteristics while section B sought information on water supply situation. Appendix II tagged survey of public sector engagement of the private sector in urban domestic water supply in Jimeta was administered to operations and management staff of the Jimeta Water Board. Appendix IIIa tagged survey of private sector participation in urban domestic water supply in Jimeta was administered to small-scale water suppliers in Jimeta. It has three sections A, B and C. Section A asked questions on contributions of the private sector in urban domestic water provision. Section B sought information on constraints of the private sector in urban domestic water supply. While section C sought for possible solutions to the constraints. Appendix IIIb is questionnaire administered to the management staff of the Adamawa Ministry for Water Resources. It has two sections A and B. Section A asked questions on constraints of the private sector in urban domestic water supply. While section B sought for possible solutions to the constraints.

3.6 Data Collection Procedure

The study started by visiting the Water Board and the small-scale service providers with the purpose of getting acquainted with them. This set the way, for

a recognisance survey around all the 11 wards of Jimeta to identify and observe water supply infrastructure. The focus of the observations was the number of treatment plants, bore- holes, hand pumps, stand pipes and other water collection points in each ward and their ownership status. The observations helped in framing the oral interview questions and in structuring the questionnaire.

Oral interviews were conducted with the management staff of the Water Board and small-scale service provider. In the interview, questions relating to different aspects of their operations were asked. Where there is additional information or statistics relevant to the study, such documents were copied.

For household survey, Households were considered in this context as independent family unit comprising married or single persons and their dependants. Only one house hold was interviewed in each compound.

3.7 Data Analysis Instrument

The data collected from the household survey was analysed to address the key questions on the characteristics of the existing water supply system, alternative sources, and expenditure on alternative sources. Accordingly, in addition to the general depiction of the pattern using descriptive statistics, the analysis was anchored on comparisons reflecting the 11 wards. Differences between the samples were assessed using Analysis of Variance (ANOVA).

Measures of central tendencies and dispersion were used in analysing the data obtained from the Water Board, SSSP, and the state Ministry for Water Resources. The percentile and mean statistical tools showed the central position of the respondents. To each mean calculated the standard deviation (s.d) values were

also calculated to express the dispersion within the respondents. Inferences was drawn after due consideration of the results obtained with these tools.

Data gathered orally from the interviews conducted were related to the observations made on the one hand, and the documented facts reviewed on the other hand. Overall conclusion of each item of study was based on the results obtained from all these primary and secondary data.

Tables and maps are employed in the presentation of the data to aid the process of analysis and enhance comprehension of findings.

3.8 Procedure for Data Analysis

Responses received were edited properly to ensure correct entry of the items in the questionnaire. Data coding schedule was also designed in accordance with the variables contained in the questionnaire. This formed the frequency utilized as the basic unit for quantitative analysis of the study. The responses are presented in tables to show how the inferences are drawn.

The 5-point likert scale was analysed with the responses rated between 1-5. Strongly agreed is rated '1' while strongly disagreed is rated '5' with the other responses in between '2' for disagree '3' for undecided and '4' for agreed respectively. The mean value 1-5 continuum is 3. Hence, any mean exceeding the mean of 3.50 upper cut off point was accepted.

3.9 Summary

This chapter has described the data and methods adopted for the study. It has indicated the sources of primary and secondary data for the study. Questionnaires, observations, oral interview and review of relevant literature were

used in data collection. Descriptive statistics such as percentage mean and dispersion as well as inferential statistics i.e analysis of variance was used in the general data analysis. Tables and charts were used in presenting the data so collected.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents analyses and discusses the data collected in the course of this study. They have been arranged in such a way that they can answer the research questions and lead to the achievement of the aim and objectives of the study.

4.2 Data Presentation and Analysis

Earlier in chapter three, the types of data needed for this study, their sources and instruments used in collecting them were identified. In this section, data obtained were presented using appropriate tables and other graphical methods. The data collected from household survey (appendix I) were analysed to address the key questions on water supply from the Water Board as well as the private commercial sources and the expenditure on water from both sources.

The data collected from the survey of public sector engagement of the private sector in domestic water supply (appendix II) were analysed to see the kind of relationship existing between Water Board boreholes and the ‘intermediate’ water suppliers on the one hand and the options for synergy between them on the other.

The data collected from private sector participation in urban domestic water supply survey (appendix IIIa) were analysed to assess the operations of the small-scale service providers, the constraints to their operations and the possible solutions to such constraints.

The state ministry for water resources being responsible for water supply comprises of the Head Quarters, Water Board, Rural Water Supply and Sanitation Agency and Small Towns Water Supply Sanitation Programme, they were exposed to the same felt constraints and possible solutions to the operations of the small-scale service providers, (appendix IIIb) the response was analysed to substantiate reactions from the small-scale water providers.

4.2.1 *Existing Water Supply Sources in Jimeta*

4.2.1.1 The Public Outfit:

Jimeta has a public water supply system that is based on both surface and ground water. The Jimeta treatment plant which is the main source and forty two submersible boreholes scattered all over the wards (appendix VI). The installed capacity of the Jimeta treatment plant is 28,800 cubic meters per day (28.8 million litres). But due to operational problems, the daily production capacity is now 7,200 cubic meters (7.2 million litres) per day. The combined daily production of the forty two (38) boreholes is now 3,024,000 litres per day, put together the total daily production is 10,224,000 litres. At present the actual supply is not known, this is attributed to the unavailability of pressure gauges and production metres; hence the inability of production personnel to keep production logs (Sadiq, 2004). When 40% system losses is subtracted and another 10% goes to industrial, institutional and commercial uses the supply is estimated to be 5,112,000 litres (ASWB, 2007). Based on an estimated population of 216,568 (projections from the 1991 census figure), the average daily water supply from the system will at

best meet only about one third ($\frac{1}{3}$) of the demand for domestic Consumption, assuming an average of 80 litres per person per day, Table 4.

Table 4: PUBLIC WATER SUPPLY AND DEMAND

M e a n D a i l y P r o d u c t i o n			M e a n D a i l y D e m a n d		
Treatment Plant	Boreholes (42)	Total	Actual Supply	Household Demand	Household Demand Met
7,200,000	3,024,000	10,224,000	5,112,000	17,325,440	35%

N:B *Installed Capacity of Plant is 28,800,000 litres per day. The production is at an average of 1,200,000 litres per hour (treatment plant) and 120 litres per hour for the boreholes.*

Source: Compiled from the Records of Adamawa State Water Board, Yola (2007)

4.2.1.2 The Commercial Outfit:

The commercial water supply outfit is essentially the digging of submersible boreholes by entrepreneurs for the sale of water either through vendors or direct sale to the consumer. There are sixty four (64) such outfits in Jimeta (Field Survey, 2007). With an average of 2 litres per second production capacity for ten hour operations, the total combined mean daily production of this outfit is 4,608,000 litres per day. Because of lack of system losses, the volume produced is actually supplied. The push cart vendors distributes 1985520 litres, while the remaining 2,614,480 litres is shared between direct purchase by households and the production of table water; yet, it will only meet one quarter ($\frac{1}{4}$) of the demand for domestic water supply Table 5.

Table 5: COMMERCIAL WATER SUPPLY AND DEMAND

Mean Daily Production		Mean Daily Demand	
Boreholes (64)	Actual Supply	Household Demand	Household Demand Met
4,608,000	4,608,000	17,325,440	25%

The production is at an average of 120 litres per hour.

Source: Field Survey (2007).

4.2.2 *Alternative Water Supply Sources*

House holds were asked to indicate other sources of water they use, but seasonal variations between wet and dry seasons has not been captured because the data collected was during the dry season. Therefore, contributions of sources like stream and rain harvesting which are associated with weather conditions have not been captured. The frequency by which each source is cited is summarized in table 6. The table shows that households utilise different sources, 14.3% use private wells, 2.4% public well, 2.4% neighbours well, 3.9% private boreholes, 9.8% public boreholes, 23.3% commercial boreholes, 1.3% public stand pipe, 40.2% push cart and 2.4% water tank vendors. A combination of commercial boreholes, push cart and water tank vendors reveals that 65.9% of the households in Jimeta uses the commercial outfit as alternative to the public water supply system. This indicates an increase on the 55% observed in previous studies (op cit.). Purchase of water from vendors was the most frequently cited source, although there are differences between the wards, it cut across all the wards. This is attributed to the door step delivery system they operate as well as regularity of service. It is heart warming to see that, despite the weather (dry season) domestic use of water from the River was at zero. The aggregate usage of wells is 19.1%

not very large a percentage, but this alternative just like the push cart vendors cut across all the wards as can be seen from the table below. However, while well water provides a source of relief from the inadequacies of the public water supply system, at shallow depths it constitutes a potential health hazard (Dada et al 1991)

Table 6: Alternative Water Supply Sources

In this section it is seen that although the public water supply substructure is not inadequate for needs of the population (except for part of Dem sawo ward (Jambutu and Damilu) that has not been covered by the water supply network) and 76.20% of house holds are connected to the public water supply system (table 7) but ineffective service has made it unreliable. This situation has made the use of alternative sources of water supply inevitable. Even though there are so many alternative sources both private and commercial, the commercial outfit which can not be compared with the public outfit in terms of infrastructure, efficient service delivery has made greater than 65% of households in Jimeta to rely on it (Table 6)

4.2.3 Access and Availability of Water Supply

4.2.3.1 The Public Outfit:

House hold survey (appendix I) was used to collect data from household for this aspect of the study. A total of 27071 was the number of households in Jimeta out of which 380 were interviewed. This sample as earlier mentioned in chapter three was drawn in proportion to the number of household in each ward.

4.2.3.1.1 Access:

The indicator to access used were households presently connected to the public water network as a proportion of total number of households as well as the activeness of such connections (connections that are presently operational) as proportion of connected household, average supply days in a week and average supply duration in a day. There are variations between the wards but for the whole of Jimeta, almost 100% of houses that are connected to the public water supply

system maintain active connections (Table 7). The reported water availability is only an average of 9 days in a month lasting for an average of two hours.

Table 7: ACCESSES TO AND AVAILABILITY OF PUBLIC WATER SUPPLY

Wards	I n d i c a t o r				
	No of HH	% of HH* Presently Connected	Activeness Of connection % of connected HH*	Avg. Supply/ Days in a month	Avg. Supply Duration Hours in a day
Ajiya	1889	81.5	95.5	8.2	1.8
Alkalawa	2290	93.8	93.3	9.6	2.2
Demsawo	2318	62.5	100	8.6	2.2
Doubeli	2151	93.5	93.1	8.8	2
Gwadabawa	1889	84	85.7	8.1	1.8
Karewa	4601	59.4	78.9	12	2.9
Limawa	1103	80	100	9	2.2
Luggere	2952	65.9	75.9	9.4	2.5
Nasarawo	3303	82.6	81.6	9.4	2
Rumde	2376	51.1	100	9.4	2.5
Yelwa	2199	83.9	96.2	9.3	2.3
Total	27071				
Gen. Avg		76.20%	90.90	9days	2hours

HH* means Household

Source: Field Survey (2007)

4.2.3.2 The Commercial Outfit:

The same instrument and procedure as in the public outfit was used here.

4.2.3.2.1 Access:

For the commercial outfit, the same indicators could not be used because indicators like connection status is not applicable since connection is not necessary to access water via the commercial outfit therefore activeness of connection does not arise. As such, percentage of household using commercial outfit as an alternative, average supply days in a month, and duration of supply in a day were used as indicators. An in the public outfit, there are variations between the wards with the commercial outfit, as summarise in Table 8 below. For the entire Jimeta, 68% uses the commercial outfit when there is no water from the

public outfit; supply from the commercial outfit is throughout the month between 6am and 9pm, that's an average of 15 hours in a day.

Table 8: ACCES TO AND AVAILABILITY OF COMMERCIAL WATER SUPPLY

Wards	I n d i c a t o r			
	No of HH*	% of HH* using Commercial outfit as An alternative	Avg. Supply/ Days in a month	Avg. Supply Duration Hours in a day
Ajiya	1889	55.6	30	6am-9pm
Alkalawa	2290	59.4	30	6am-9pm
Demsawo	2318	81.3	30	6am-9pm
Doubeli	2151	64.6	30	6am-9pm
Gwadabawa	1889	88	30	6am-9pm
Karewa	4601	43.8	30	6am-9pm
Limawa	1103	66.7	30	6am-9pm
Luggere	2952	77.3	30	6am-9pm
Nasarawo	3303	60.9	30	6am-9pm
Rumde	2376	57.6	30	6am-9pm
Yelwa	2199	90.3	30	6am-9pm
Total	27071			6am-9pm
Gen. Avg		68.00%	All days	15 hours

HH* means Household

Source: Field Survey (2007)

In terms of access to water supply, when the 76.20% of the households that are presently connected to the public water supply is added to the 1.3% households that uses public stand pipe as an alternative water supply source, the public water supply system has an edge over the commercial water supply outfit with 68% accessibility profile across Jimeta. The reverse is the case with availability of water supply. While water supply with the commercial outfit is all days of the month with an average of 15 hours duration, the public outfit supply for an average of 9 days in a month with duration of 2 hours.

4.2.3.3 Expenditure on Water

4.2.3.3.1 The Public Outfit:

In the public water supply system in Jimeta, the tariff is based on a flat monthly rate of ₦50 per compound post payment billing system, as there are no metered connections (Water Board 2005). This is irrespective of the level of service offered and irrespective of the number of households in a compound. By 2007 the status quo is maintained. Households were asked whether they pay water bills or not. Table 9 presents the responses across all the wards.

Table 9: HOUSE HOLD'S WATER BOARD MONTHLY BILL PAYMENT

Wards	R e s p o n s e s			Total
	Those Who Do Not Pay Bills Monthly	Not Applicable	Those Who Pay Bills Monthly	
Ajiya	12	5	10	27
Alkalawa	12	3	17	32
Demsawo	10	12	10	32
Doubeli	18	0	13	31
Gwadabawa	8	5	12	25
Karewa	21	24	19	64
Limawa	9	2	4	15
Luggere	19	12	13	44
Nasarawo	33	9	4	46
Rumde	13	13	7	33
Yelwa	18	3	10	31
Total	173	88	119	380

Source: Field Survey (2007)

The aggregate are 45.53 percent those who do not pay bills monthly, 31.31 percent those who pay bills monthly, and 23.16 percent not applicable (not connected to the public water supply system). When the 23.16 percent non-responsive households are excluded, the percentage of those paying bills (PB) and those not paying (NPB) becomes 40.75 and 59.25 respectively as shown in the pie

chart below. With the ₦50 flat rate per compound per month charge by the Water Board, public water supply is almost free, yet close to two-third of house hold in Jimeta do not pay water bills (Figure 2).

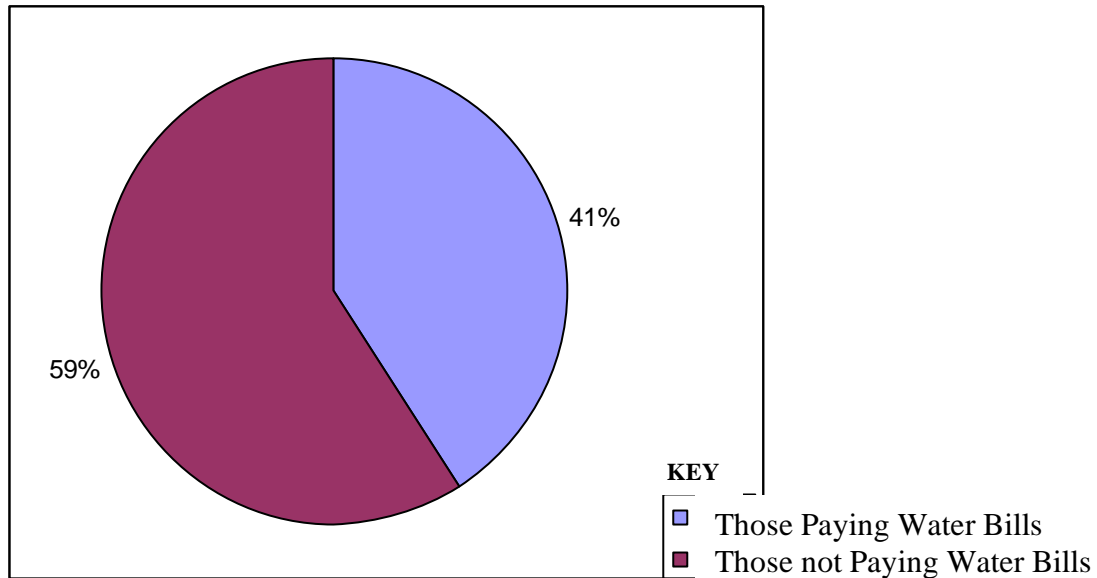


Figure 2: PUBLIC WATER BILL PAYMENT
Source: Field Survey (2007)

The Adamawa State Water Board December monthly report (2004) indicates a paltry sum of ₦1, 128,200.00 for the whole year Table 10.

Table 10: JIMETA DISTRICT MONTHLY REVENUE COLLECTION, 2004

S/N	Months	Revenue in Naira (₦)
1	January	₦ 81,300
2	February	₦ 119,360
3	March	₦ 105,940
4	April	₦ 103,240
5	May	₦ 103,620
6	June	₦ 93,130
7	July	₦ 110,860
8	August	₦ 140,860
9	September	₦ 104,260
10	October	₦ 165,630
11	November	₦ 204,904
12	December	-----
Total		₦ 1,128,200

Source: Water Board, 2005

4.2.3.3.2 The Commercial Outfit:

The commercial outfit does not have a network system of water distribution, as such households or compounds are not billed directly. Therefore billing is based on service offered based on a predetermined amount of money per volume of water supplied. Direct purchase from independent suppliers and indirect purchase through vendors cost differently. A push cart of 240 litres of water cost ₦50 (direct purchase) and ₦120 (indirect purchase) Field Survey 2007.

Households were asked to indicate amount of money spent on purchase of water from commercial outfit. The responses are as presented on table 11. Households in Ajiya expressed a mean daily expenditure of ₦141.60 which translates to ₦4248.00 mean monthly expenditure on water purchase. Households in Alkalawa ₦4703.22, Demsawo ₦5520.00, Doubeli ₦4282.77, Gwadabawa ₦5236.35, Karewa ₦4687.50, Limawa ₦3857.13, Luggere ₦4939.53, Nasarawo ₦4628.58, Rumde ₦4531.02, and Yelwa ₦4354.83 respectively.

It can be seen from table above that, there are no wide variations in proportion of households purchasing water and the mean values for the purchase. This is indicative of the homogeneity of water supply situation across all the wards.

Table 12: DAILY PURCHASE OF WATER BY HOUSEHOLDS

Wards	N	Households Buying water (%)	Mean (Naira)	Standard Deviation
Ajiya	27	55.6	141.6	28.8
Alkalawa	32	59.4	156.77	49.8
Demsawo	32	81.3	184	48.83
Doubelli	31	64.5	142.76	29.11
Gwadabawa	25	88	174.55	35.77
Karewa	64	43.8	156.25	41.96
Limawa	15	66.7	128.57	44.54
Luggere	44	77.3	164.65	50.27
Nasarawo	46	60.9	154.29	34.99
Rumde	33	57.6	151.03	33.87
Yelwa	31	90.3	145.16	29.61
Jimeta	380	67.8	N154.5	38.87

Analysis of Variance (Daily purchase of Water across Wards): Single Factor

Source of Variation	Ss	Df	Ms	F	P-value	F crit
Between Groups	843.2727	10	84.32727	0.417211	0.932428	2.007792
Within Groups	11116.67	55	202.1212			
Total	11959.95	65				

SOURCE: Field Survey (2007)

An analysis of pattern of expenditure based on the F statistics for analysis of variance reveals the differences between the eleven (11) wards are not significant at 95% confidence level, (Table 12). Since the value calculated (F) is less than the value tabulated (F crit) it implies that difference in location (wards) does not affect expenditure.

It can be seen from Table 11 that greater than 90% of households in Jimeta spends between ₦120 and ₦180 daily on water purchase. This translates to

spending between ₦3600 to ₦5400 monthly on water alone. This means that a large percentage of house holds monthly income is spend on the purchase of water. This is better appreciated when mean monthly expenditure on domestic water across income groups is looked at, Table 13.

Table 13: PERCENTAGE INCOME SPENT ON WATER PURCHASE ACROSS INCOME GROUPS

INCOME RANGE	PERCENTAGE IN SAMPLE POPULATION	MEAN DAILY EXPENDITURE	MEAN MONTHLY EXPENDITURE	PERCENTAGE INCOME SPENT
<₦10000	27.6%	₦141.2121	₦4236.363	42.36%
10000-15000	39.4%	₦155.9155	₦4677.465	46.77%
16000-20000	15.8%	₦162.5	₦4875	48.75%
21000-25000	5.6%	₦180	₦5400	54.00%
26000-30000	4.2%	₦210	₦6300	63.00%
>₦30000	7.4%	₦153	₦4590	45.90%

Source: Field Survey (2007)

In Table 13 above has shown that the income ranges of house hold Heads in Jimeta is between ₦10, 000 and ₦30, 000. Bearing in mind the obvious limitation of assessing people's income from survey of this nature, in view of lack of reliability of information given, 27.6%, 39.45, 15.8%, 5.6%, 4.2% and 7.4% falls into the income range respectively. 67% of house holds heads earn between ₦10, 000 and ₦15, 000 monthly, more than 40% of this amount is spent on water purchase monthly. It is equally obvious from the percentage of income spent on that table that the higher the income the greater the amount spent. This could be attributed to the type of housing occupied by house holds (Social Stratification), as the nature of toilet convenience which is determined by the type of housing influences water requirements; and the fact that the water situation is the same irrespective of the ward one is residing.

Expenditure on water purchase from both the public and the commercial outfit indicate that, while water from the public outfit is almost free with a flat rate of ₦50 per compound per month, on daily basis, households spends an average of three times this amount (₦154.5) on water purchase from the commercial outfit in Jimeta. This translate to ₦4635 monthly, this is more than 40% of households disposable income (Table 13).

4.2.4 *Operations of the Small-Scale Water Providers*

Under this section, the characteristics of the respondents were presented as well as their responses to some general questions regarding their operations in the survey of private sector participation in urban domestic water supply in Jimeta (appendix IIIa, section A). Inference on the general questions regarding the operations of the small scale domestic water providers were drawn from a table of summary of responses (Table 14). Respondents rated on a 5 point likert scale their degree of agreement or otherwise with given statements concerning their operational problems and possible solutions. The state Ministry for Water Resources being a principal partner representing the public outfit were expose to the same statements to show their level of agreement or disagreement, both were also given the opportunity to freely comment or give further suggestions on the issues raised (appendix IIIa, section B). In order to quantify the responses received, their responses were weighted as follows:

Weight	Points
Strongly agree (SA)	5
Agree (AG)	4
Undecided (UN)	3
Disagree (DA)	2
Strongly Disagree (SD)	1
Total	15

$$\text{Mean (X= EFX / EF)} \quad 15/5=3$$

Hence, upper boundary 3.05 and lower boundary 2.95

As stated in chapter three, significant inferences were drawn on calculated mean values outside the lower boundaries here given.

4.2.4.1 Characteristics of Respondents

The small scale urban domestic water providers comprises of those that are independent and those that are intermediate (classification based on source of water that is being supplied. (See definition of terms). A total of 342 respondents participated in this aspects of the study. There were 300 push cart vendors (PCV), 32 commercial boreholes operators (CBO) and 10 water tank vendors (WTV), as shown in the chart below

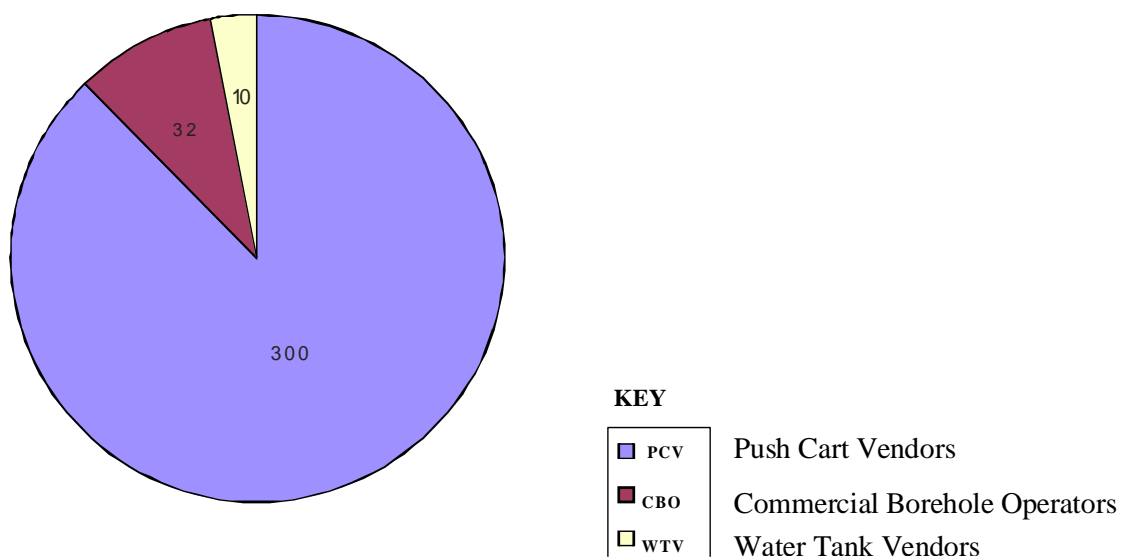


Fig. 3 DISTRIBUTION OF RESPONDENTS PRIVATE OUTFIT
Source: Field Survey (2007)

The state Ministry For Water Resources being a principal partner representing the public were equally expose to the same statements to show their level of agreement or otherwise. The ministry is composed of four units, Headquarters (HQ), Water Board (WB), Rural Water Supply and Sanitation Agency (RUWATSSAN) and Small Towns Water Supply and Sanitation Programme (STWSSP). Four Directors out of six in the HQ, four Assistant General Manager out of six in the WB, three Directors out of five in RUWATSSAN and three principal officers out of five in STWS were involved in the study as shown in the chart below.

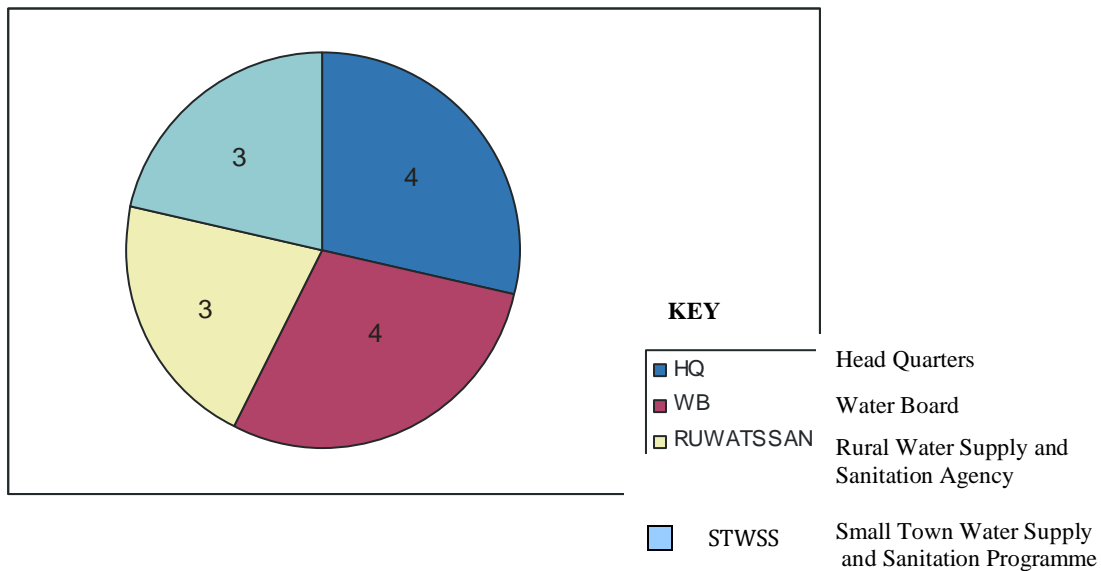


Fig. 4: DISTRIBUTION OF RESPONDENTS PUBLIC OUTFIT
Source: Field Survey (2007)

These numbers were arrived-at base on the population and sampling methods prescribed for this study in chapter three.

4.2.4.2 General Operational Questions

Respondents were asked their status, source of finance for the business, average number of tanks/push cart sold a day, cost of a tank/push cart, whether they belong to an association or not, whether they are into savings club or not, their relationship with the Water Board and how they will want to be engaged by the Water Board. Their combined summary of responses is as presented in Table 14.

Table 14: COMBINED SUMMARY OF RESPONSES ON GENERAL OPERATIONAL QUESTIONS ON SSSP

		Water-Tank Vendors	Push-Cart Vendors	Commercial Boreholes
S/N	Questions	Summary of Responses	Summary of Responses	Summary of Responses
1	Status	Intermediate	Intermediate	Independent
2	Source of entry finance	Hire, 100%	Hire, 90.3% 9.7%	Psnlsvgs,93.7% fmlsvgs,6.3%
3	Avg. total number of tanks/push cart sold a day	60 tanks	8273 pushcarts	7936 push carts
4	Avg. cost of a tank/push cart content	N4000	N120	N30
5	Do you belong to any association	No, 100%	No, 95.7% Yes, 4.3%	No,100%
6	Are you into a savings club	No, 40% Yes, 60%	No, 88.3% Yes, 11.7%	No,100%
7	What is your relationship with the Water board	Vendor, 100%	Null, 100%	Null,100%
8	How will you want to be engaged by the Water board	Vendor, 100%	Vendor, 100%	Lease contract for Water Board bore holes 100%

Source: Field Survey (2007)

From the table 14 above, it is shown that the water tank and push cart vendors are the intermediate water providers, since they depends on either the Water Board or the Commercial Boreholes to get water, while the Commercial Boreholes are independent because they own their source of water which can be bought directly from them by households or indirectly through vendors. Field Survey, (2007) have shown that for now, the Commercial Boreholes have no pipe distribution outfit to households. For the source of business finance, 100% of the Water Tank Vendors do not own their tankers but operate on hire basis, 90.3% of the Push cart Vendors operates on hire while 9.7% own their carts. 93.7% of the owners of Commercial Boreholes set up the business through personal savings and only 6.3% otherwise.

The water tank and push cart vendors sales an average total of 60 tanks and 8275 push carts respectively, while the commercial boreholes sales a total average of 7936 push cart a day. The average cost of a tanker content is ₦4000, push cart content ₦120 from vendors and ₦30 from commercial boreholes.

100% of the water vendors and commercial boreholes owners and 95.7% of push cart vendors does not belong to any business association, while only 4.3% of the push cart vendors belong to an association. Asked whether or not they belong to any savings club, 60% of the water tank vendors said YES, while 40% said NO. 88.3% of the push cart vendors do not belong to any saving club while 11.7% do. 100% of the commercial boreholes owners does not belong any savings club.

For their relationship with the Water Board, all the water tank vendors have a relationship with the Water Board (fetch water from Water Board boreholes). While the push carts vendors and the commercial boreholes have no relationship with the Water Board at all. While 100% of the water tank vendors want the same relationship with the Water Board to continue, all the push cart vendors and the commercial boreholes wants to be engaged by the Water Board as water vendors and managers respectively.

The Water Board (borehole operations) have about 37 functional boreholes scattered across the wards to supplement water supplied from the Jimeta treatment plant. 19 bore holes selected in proportion to the number of such boreholes in each ward was the sample (chapter three). The survey of public sector engagement of the private sector in domestic water supply (appendix II)

ask the Water Board borehole operators specific questions as regards to engaging small scale water providers in their operations. The responses are as presented in Table 15 below.

Table 15: SUMMARY OF RESPONSES ON WATER BOARD (BOREHOLE OPERATIONS) ENGAGEMENT OF SSWP IN THEIR OPERATIONS

S/N	Questions	Summary of Responses
1	Do you sell water to water vendors	No, 95.2 % Yes, 4.8%
2	If yes, what type	100% Water tanks
3	How much is a tanker	100% N200
4	Is demand decreasing or increasing over the last 5 years	100% Increasing
5	How will you want to engage the Private sector in a partnership	95% Push cart vendors & Water tank vendors, 5% lease contract for water board bore holes
6	Will the partnership be effective	95.2% Yes, 4.8% No,

Source: Field Survey (2007)

From table 15, 95.2 of the Water Board boreholes do not engage water vendors in water distribution. The 4.8% that engages the water vendors engages only the water tank vendors; the amount per tank is ₦200. Asked how they feel the private sector should be engaged, 95% are of the opinion that engaging the private sector should be limited to push cart and water tank vendors, while 5% feel it can be extended to lease contract for Water Board boreholes. 95.2% feel the partnership will be effective, while 4.8% feel it will not be effective.

In this section it has been reported that, covering about 20% of the push cart vendors, 50% of the commercial boreholes, 83% of the water tank vendors and 67% of the management staff in the state Ministry for Water Resources, the study collated information on the organisational and operational activities of the small scale water providers. It reveals that 100% and 90% of the water tank and

push cart vendors do not own the business. Although 93% of the commercial borehole operators own their business, it was entirely through personal savings. In terms of their contributions, 600, 000 litres, 1, 986, 000 litres and 1,904, 640 litres is what is supplied daily by water tank vendors, push cart vendors and the commercial boreholes respectively. As regards to their relationship with the Water Board, it is only the water tank vendors that have the relationship of fetching water from a single point (hydrant) of the Water Board.

4.2.5 *Constraints to Effective Participation*

The next five subsections have been collated from responses to sections A and B of appendix IIIa and IIIb in which problem areas identified with the operations of the small scale water providers were listed for respondents to indicate their level of agreement or otherwise with issues raised. The overall picture of the constraints inferred from this section is used as a basis to the proffered solutions.

4.2.5.1 Underestimating the Contributions of SSSP:

The statement put the respondent to indicate their level of agreement or disagreement is “Public authorities are not familiar with the workings of small scale service providers and generally underestimate the magnitude of their contributions”. The result obtained as presented in table 14 shows although those in the Ministry of Water Resources disagree and the commercial boreholes are undecided, respondent agree with the statement judging from the overall mean value of 3.87. The standard deviation of 0.9653 is an indication that their opinions were not very much diverse.

Table 16: PUBLIC AUTHORITIES ARE NOT FAMILIAR WITH THE WORKINGS OF SMALL SCALE SERVICE PROVIDERS AND GENERALLY UNDERESTIMATE THE MAGNITUDE OF THEIR CONTRIBUTIONS

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Freqncy f	Fx
1	3	3	0	0	6	6
2	5	10	23	0	38	76
3	1	2	39	0	42	126
4	4	11	156	9	180	720
5	1	6	81	1	89	445
Totalfrqncy	14	32	299	10	355	1373
Mean	2.64	3.22	3.99	4.1	13.95	3.87
S.D	1.29	1.32	0.84	0.3	3.75	0.97
Inference	Undecided	Undecided	Agreed	Agreed		Agreed

Source: Field Survey (2007)

4.2.5.2 Lack of Targeted Financing for SSSP from the Government:

In respond to the statement that “there is lack of targeted financing for SSSP from the government”. The respondents indicated their level of agreement or otherwise on table 16 below. The overall mean value of 4.17 from the table shows that respondents agree with the statement. A look at the individual groups reveals that they all agree with the statement with significant strength in their individual mean. The standard deviation values obtained showed a relatively homogeneous situation.

Table 17: LACK OF TARGETED FINANCING FOR SSSP FROM THE GOVERNMENT

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Freqncy f	Fx
1	0	0	0	0	0	0
2	2	0	7	0	9	18
3	0	0	9	0	9	27
4	3	27	211	9	250	1000
5	9	5	73	1	88	440
Totalfrqncy	14	32	300	10	356	1485
Mean	4.36	4.16	4.17	4.10	16.78	4.17
S.D	1.04	0.36	0.58	0.30	2.29	0.59
Inference	Agreed	Agreed	Agreed	Agreed		Agreed

Source: Field Survey (2007)

4.2.5.3 Lack of a Framework That Could Source Finance from Philanthropies and

Donor Agencies:

The public good nature of water is felt to be enough reason why donor agencies involve in portable water provision should extend such gesture to SSSP. On this basis, respondents were ask to show their level of agreement or otherwise with the statement that ‘‘There is lack of a framework for including funding from donor agencies and philanthropies’’. Data collected from the respondents were summed up in table 18 below:

The table reveals that the respondents were not widely divided on the issue and with an overall mean value of 4.12, the respondents agree with the statement. The central position of all the subgroups of the respondents equally agrees with the statement.

Table 18: LACK OF A FRAMEWORK FOR INCLUDING FUNDING FROM DONOR AGENCIES AND PHILANTHROPIES

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Freqncy f	Fx
1	1	0	0	0	1	1
2	1	0	6	0	7	14
3	1	0	26	0	27	81
4	9	27	190	9	235	940
5	2	5	78	1	86	430
Totalfrqncy	14	32	300	10	356	1485
Mean	3.71	4.16	4.13	4.10	16.10	4.12
S.D	1.03	0.36	0.63	0.30	2.33	0.64
Inference	Agreed	Agreed	Agreed	Agreed		Agreed

Source: Field Survey (2007)

4.2.5.4 Difficulty in Obtaining Loan from Commercial Banks:

Because of the small scale nature of their business operations, the small scale water providers as well as their regulators were ask to respond to the issue

of financing small scale water provision by the commercial banks with the statement that “There are no incentives and credit enhancement for small scale service providers from the commercial banks”.

The respondents spread across all the options given as such the standard deviation value was between 0.40 and 1.44. However, the central position of each of the subgroups is that they agreed with the given statement except the Ministry for Water Resources who were rather undecided. The overall mean value obtained was 4.16 meaning that they agreed.

Table 19: LACK OF FINANCING FROM COMMERCIAL BANKS

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Frequency	Fx
1	3	0	0	0	3	3
2	2	0	8	0	10	20
3	3	0	24	0	27	81
4	3	22	171	8	204	816
5	3	10	97	2	112	560
Total frequency	14	32	300	10	356	1480
Mean	3.0714	4.3125	4.19	4.2	15.7739	4.1573034
S.D	1.437472	0.463512	0.688404	0.4	2.989388	0.7026
Inference	Undecided	Agreed	Agreed	Agreed		Agreed

Source: Field Survey (2007)

4.2.5.5 Duplication of Duties by Regulatory Outfits:

It is a general feeling among the small scale service providers that, the activities of the regulatory outfits of the private water providers are not streamlined, as multiple taxes and revenues are collected from the water providers. On this issue, the level of agreement or disagreement of respondents was sought. The result obtained is as presented on table 20.

The table shows that all the subgroups interviewed agreed with the statement. The commercial boreholes were most significant in their level of agreement with a mean value of 4.16 while the push cart vendors' strength of agreement is low with a mean value of 3.61. The overall mean value of 3.64 means that respondents agree with the statement but the strength of this level of agreement is significantly low:

Table 20: DUPLICATION OF DUTIES BY REGULATORY OUTFITS

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Frequency	Fx
1	0	0	3	0	3	3
2	1	5	107	0	113	226
3	3	0	2	3	8	24
4	8	24	80	5	117	468
5	2	3	108	2	115	575
Total frequency	14	32	300	10	356	1296
Mean	3.7857	4.1563	3.61	3.9	15.452	3.6404494
S.D	0.772618	0.363092	1.315763	0.7	3.151473	1.2497
Inference	Agreed	Agreed	Agreed	Agreed		Agreed

Source: Field Survey (2007)

This section raised five questions for respondents to agree or disagree. They agree with all the problem areas identified. Items 1-5 of table 25 contain a compressed summary of findings from each of the five issues raised in this section. The open ended questions identified other problem areas with the operations of the SSSP. They both on lack of planned mode of operations and the lack of formidable association to serve as representative interlocutors.

4.2.6 Possible Solutions to the Identified Constraints

Sections B and C of appendix IIIa and IIIb gathered from the respondent's data on possible solutions to the operational constraints of the small scale water

providers already identified. The next five subsections present and analyse the responses received from those interviewed on these possible solutions.

4.2.6.1 Recognising the Role of SSSP by the Government:

The first suggestion put the respondents was that one of the possible solution to the constraints to effective service provision faced by the small scale water providers is “the first step to improving service offered by SSSP is for public authorities to recognise their role”. They were to agree or disagree on a 5 point likert scale as in previous sections. The result obtained on this aspect of the survey is contained in table 20.

It was overwhelmingly affirmative as the overall mean value falls at 4.96 indicating that they strongly agree with the proposal; the standard deviation value of 0.22 shows that they were highly homogeneous in their agreed position.

Table 21: RECOGNISING THE ROLE OF SSSP BY THE GOVERNMENT

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Freqncy f	Fx
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	2	0	0	0	2	6
4	2	7	0	0	9	36
5	10	25	300	10	345	1725
Totalfrqncy	14	32	300	10	356	1767
Mean	4.57	4.78	5	5	19.35	4.96
S.D	0.73	0.41	0	0	1.14	0.22
Inference	Agreed	Agreed	Strongly Agreed	Strongly Agreed		Strongly Agreed

Source: Field Survey (2007)

4.2.6.2 The Need for Regulations That Are Supportive of the Activities of SSSP:

Respondents were ask to identify or disagree with the statement “public authorities should establish a regulatory framework which is based on supportive

and consultative relationship between service providers and authorities responsible for water supply oversight’’. Table 22 contain the result obtained.

The overall position of the respondents is that they agree with the suggestion. The mean value overall and from each of the groups attest to this, as there is no respondent that disagreed with the statement. The standard deviation individually and overall shows a high degree of homogeneity.

Table 22: THE NEED FOR REGULATIONS THAT ARE SUPPORTIVE OF THE ACTIVITES OF SSSP

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Freqncy f	Fx
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	8	24	222	8	262	1048
5	6	8	78	2	94	470
Totalfrqncy	14	32	300	10	356	1518
Mean	4.43	4.25	4.26	4.2	17.14	4.264
S.D	0.50	0.433	0.439	0.40	1.77	0.44
Inference	Agreed	Agreed	Agreed	Agreed		Agreed

Source: Field Survey (2007)

4.2.6.3 The Need to Involve Multinational Organisations and Donor Agencies:

Another suggestion put to the respondents bothers on co-funding small scale water provision due to the public good nature of portable water supply. ‘‘multinational organisations such as the European Union engage in co-funding water supply projects at the local government/community level can extend such gesture to small scale suppliers’’. The reactions of the respondents are summed up in Table 23.

The table reveal that this could be a viable solution. Except for the commercial boreholes who are undecided about the issue raised, it is generally

agreed with by all the other groups with an overall mean value of 4.02; the standard deviation of 0.78 shows that the agreement is even homogeneous.

Table 23: THE NEED TO INVOLVE MULTINATIONAL ORGANISATIONS AND DONOR AGENCIES

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Frequency	Fx
1	1	0	0	0	1	1
2	1	8	2	0	11	22
3	1	12	54	0	67	201
4	5	8	161	5	179	716
5	6	4	83	5	98	490
Total frequency	14	32	300	10	356	1430
Mean	4	3.25	4.08	4.50	15.83	4.02
S.D	1.20	0.97	0.69	0.50	3.35	0.78
Inference	Agreed	Undecided	Agreed	Agreed		Agreed

Source: Field Survey (2007)

4.2.6.4 The Need to Create an Enabling Environment for SSSP:

Another solution suggested by the researcher is that “the federal government in line with its NWSSP 2000, which endorses private sector participation and commercialization of water supply, should create the enabling environment for accessing funds as is obtainable with other fundamental requirements for living such as housing”. The overall response received has been reported in Table 24.

The central tendency of the respondents is that they agree with the idea, the mean value of 4.30 and a standard deviation of 0.52 shows that they are homogeneous in the agreed position.

Table 24: THE NEED TO CREATE AN ENABLING ENVIROMENT FOR SMALL SCALE SERVICE PROVISION

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Freqncy f	Fx
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	11	0	11	33
4	6	16	201	5	228	912
5	8	16	88	5	117	585
Totalfrqncy	14	32	300	10	356	1530
Mean	4.57	4.50	4.26	4.50	17.83	4.30
S.D	0.50	0.50	0.51	0.50	2.00	0.52
Inference	Agreed	Agreed	Agreed	Agreed		Agreed

Source: Field Survey (2007)

4.2.6.5 The Need to Avoid Multiple Taxes and Revenues:

It was put to the respondents that one of the possible ways of reducing the financial burden on SSSP is for “the activities of National Agency for Food and Drug Law Administration and Control (NAFDAC), Adamawa State Urban Planning and Development Authority, Adamawa State Ministry of Commerce, Adamawa State Board of Internal Revenue, Local Government Councils etc, in respects of taxes and revenues need to be streamlined to reduce the financial burden on SSSP as an incentive”. The result obtained on this issue is contained in table 25.

It was affirmative with an overall mean value of 4.00, indicating that they agreed with the suggested solution, with the exception of push cart vendors who are undecided, all other groups agreed and had a low standard deviation value indicating homogeneity of response.

Table 25: THE NEED TO AVOID MULTIPLE TAXES AND REVENUES

Scores	Min for Water Resources	Commercial Boreholes	Push carts Vendors	Water Tank Vendors	Total Freqncy f	Fx
1	0	0	3	0	3	3
2	0	3	103	0	106	212
3	2	1	68	3	74	222
4	9	21	104	1	135	540
5	3	7	22	6	38	190
Totalfrqncy	14	32	300	10	356	1167
Mean	4.57	4.00	3.13	4.30	16.00	4.00
S.D	0.73	0.791	1.00	0.90	3.42	0.86
Inference	Agreed	Agreed	Undecided	Agreed		Agreed

Source: Field Survey (2007)

This section raised five possible solutions to the identified operational problems of SSSP for respondents to agree or disagree with. They agreed with all the proffered solutions. Items 1-5 of table 27 contained a compressed summary of findings from each of the issued raised in this section. The open ended question suggested the need for professional development among SSSP by belonging to professional associations.

4.2.7 Public-Private Partnership Options

The literature on water supply is divided into three: There are written materials describing the different options for water services in large cities, there is also a large body of knowledge about community management of small scale water supplies and lastly the intermediate case of water supply in small towns which are too large for community management to work effectively, yet too small to warrant the involvement of large private companies or water utilities (World Bank 2002). Unfortunately most urban areas in Nigeria are large enough to have water utilities and they indeed have, but does not have sufficient portable water

supply. This makes them a haven for small-scale service providers. The thrust of this study is in bringing this all important middle category into a partnership with the public water utility.

From the seven (7) models of private sector participation reviewed in chapter two as well as the inferences from the general questions regarding the operations of the SSSP in chapter four, the public private partnership options in Jimeta are open to almost all the models. Except for privatization as a model which the NWSSP (2000) does not cover, all the other six (6) models can be operational in the study area.

4.3 Summary of Findings

Based on the data collected, presented and analysed in this study, the following findings are summarised. Table 26 and 27 shows the specific inference from data collected on each of the items investigated with appendix IIIa and IIIb to help sum up the hidden details of some of the findings. The major findings are however outlined below:

(a) In terms of organisation, the public water supply substructure is not inadequate for needs of the population (except for part of Dem sawo ward (Jambutu) that has not been covered by the water supply network) but ineffective service has made it unreliable. The commercial outfit which can not be compared with the public outfit in terms of infrastructure, efficient service delivery has made greater than 65% of households in Jimeta to rely on it (Table 5)

- (b) In terms of access to water supply, the public water supply system with 77.23% has an edge over the commercial water supply outfit with 68% accessibility profile across Jimeta.
- (c) In terms of availability of water supply, while water supply with the commercial outfit is all days of the month with an average of 15 hours duration, the public outfit supply for an average of 9 days in a month with duration of 2 hours.
- (d) Expenditure on water purchase from both the public and the commercial outfit indicate that, while water from the public outfit is almost free with a flat rate of N50 per compound per month, (yet $\frac{1}{3}$ of house holds do not water bills, (Figure 2) on daily basis, households spends an average of three times this amount (₦154.5) on water purchase from the commercial outfit in Jimeta. This translate to N4635 monthly, this is more than 40% of households disposable income (Table 11).
- (e) As regards to business ownership, 100% and 90% of the water tank and push cart vendors do not own the business. Although 93% of the commercial borehole operators own their business, it was entirely through personal savings.
- (f) In terms of their contributions, 600, 000 litres, 1, 986, 000 litres and, 904, 640 litres is what is supplied daily by water tank vendors, push cart vendors and the commercial boreholes respectively.
- (g) As regards to their relationship with the Water Board, it is only the water tank vendors that have the relationship of fetching water from a single point (hydrant) of the Water Board.

- (h) Public authorities are not familiar with the workings of small-scale service providers and generally underestimate the magnitude of their contributions.
- (i) There is lack of targeted financing for small scale service providers from government.
- (j) There is lack of a framework for including funding from donor agencies and philanthropists.
- (k) There are no incentives and credit enhancement for the small-scale service providers from commercial banks.
- (l) The activities of the regulatory outfits of the private water providers are not streamlined, as such, multiple taxes and revenues are collected from the water providers.
- (m) The first step to improving service offered by small-scale service providers is for public authorities to recognize their role.
- (n) The public authorities should establish a regulatory framework which is based on a supportive and consultative relationship between service providers and authorities responsible for water supply oversight.
- (o) Multinational organizations such as the European Union (EU) engage in co-funding water supply projects at local government/community level can extend such gesture to small-scale suppliers.
- (p) The Federal Government in line with its national water supply and sanitation policy 2000, which endorses private sector participation and commercialization of water supply, should create the enabling environment for

accessing funds as is obtainable with other fundamental requirements for living such as housing.

- (q) The activities of the National Agency for Food Drug Administration and Control (NAFDAC), Urban Planning and Development Authority (UPDA), Ministry of Commerce, Board of Internal Revenue, Local Government etc. in respect of taxes and revenue needs to be stream lined to reduce the financial burden on the small- scale service providers as an incentive.

Table 26: COMPRESSED SUMMARY OF THE KEY FINDINGS FROM EACH OF THE FIVE ISSUES REGARDING THE OPERATIONAL CONSTRAINTS OF THE SMALL SCALE WATER PROVIDERS RAISED IN THIS SECTION

S/N	ISSUE	OVERALL MEAN	STANDARD DEVIATION	INFERENCE
1	Public authorities are not familiar with the workings off small-scale service providers and generally under estimate the magnitude of their contributions.	3.87	0.97	AGREED
2	There is lack of targeted financing from government.	4.17	0.59	AGREED
3	There is lack of framework for including funding from donor agencies and philanthropists.	4.12	0.64	AGREED
4	There are no incentives and credit enhancement for the small-scale service providers from commercial banks	4.16	0.70	AGREED
5	The activities of the regulatory outfits of the private water providers are not stream lined, as such, multiple taxes and revenues are collected from the water providers.	3.64	1.25	AGREED

Source: Field Survey (2007)

Table27: COMPRESSED SUMMARY OF THE KEY FINDINGS FROM EACH OF THE FIVE ISSUES REGARDING POSSIBLE SOLUTIONS TO THE OPERATIONAL CONSTRAINTS OF THE SMALL SCALE WATER PROVIDERS RAISED IN THIS SECTION

S/N	ISSUE	OVERALL MEAN	STANDARD DEVIATION	INFERENCE
1	The first step to improving service offered by small-scale service providers is for public authorities to recognize their role.	4.96	0.22	STRONGLY AGREED
2	The public authorities should establish a regulatory framework which is based on a supportive and consultative relationship between service providers and authorities responsible for water supply oversight.	4.26	0.44	AGREED
3	Multinational organizations such as the European Union (EU) engage in co-funding water supply projects at local government/community level can extend such gesture to small-scale suppliers.	4.02	0.78	AGREED
4	The Federal Government in line with its national water supply and sanitation policy 2000, which endorses private sector participation and commercialisation of water supply should create the enabling environment for accessing funds as is obtainable with other fundamental requirements for living such as housing.	4.30	0.52	AGREED
5	The activities of the National Agency for Food Drug Administration and Control (NAFDAC), Urban Planning and Development Authority (UPDA), Ministry of Commerce, Board of Internal Revenue, Local Government etc. in respect of taxes and revenue needs to be streamlined to reduce the financial burden on the small-scale service providers as an incentive.	4.00	0.86	AGREED

Source: Field Survey (2007)

4.4 Discussion

An effort is made at this stage to discuss the major findings of the study to address the key research questions raised regarding the situation of water supply in Jimeta and the prospect of a public-private partnership in domestic water supply and what that means to the development of Jimeta.

4.4.1 The Current Water Supply Scenario

The Adamawa State Water Board is supposed to enjoy a monopoly in domestic water provision because it is a 'public service', but due to operational in

efficiency, the Water Board is only able to meet an estimated (no metering of production and distribution) 35% of household's demand for water for an average of 9 days in a month with an average of 2 hours supply duration. As a result, $\frac{2}{3}$ of households in Jimeta do not pay water bills which is nearly free at ₦50 per month per compound. Similar operational inefficiencies in other state water agencies have been indicated by the monitoring indicators compiled under the National Water Rehabilitation Project (FMWR, 2000). This situation is equally documented by Ayaode (1981) and Sani (1992) in Nigeria and in other developing countries by Urban Age (1993) and World Bank (1994).

This circumstance has led to a spontaneous emergence of small scale commercial alternative sources (Tova, 1998 and Libby, 2000). In Jimeta presently, this outfit meets only 25% of household demand for water but with every day supply for an average of 15 hours duration except that households pay 3 times what they will ordinarily pay for the same service from the public outfit even if the tariff is on economic principle. The amount paid for the services of SSSP is high because they provide 'public service' without any subsidy. They deserve the recognition and support of National, State and local authorities.

4.4.2 The Prospects of a Public-Private Partnership

As reported by Collingnon and Vezina (2000) in a full report of a Ten-Country study of Independent Water and Sanitation Providers in African Cities, City-wide utilities contracts with private operators to improve access to portable water supply at reduce price. In Jimeta, the result of the survey shows that partnership between the two outfits is feasible based on the already existing

relationship between the Water board and the water tank vendors as well as willingness on both sides to engage each other. This is proposed in the final aspect of this study.

4.4.3 Urban Development Implications of the Findings

As a vital service required universally for direct human consumption and as an input in the various production process in the urban economy, water supply is central to urban development (WSSISN 2000, Ma'aruf 20005). The United Nation Centre for Human Settlement (1999) envisaged that a collaborative approach between the private and the public sector will improve access to save domestic water. This, it says will imply less burden on people in terms of water collection, reduce burden on water related diseases, create new investment opportunities, reduce budgetary allocation to the public water agencies, enhance productivity and reduce poverty by creating job opportunities as well as reducing the amount spent on procuring water. On these premises, the scenario as represented by the situation in Jimeta has important implication in these respects.

4.4.3.1 Improved Access to Portable Water Leading To Positive Health Externalities:

Table 4 above shows that the commercial outfit (which is entirely from submersible boreholes) meets 25% of house hold's demand for water. This represents the percentage improvement of access to portable water supply. The door step delivery system operated by the SSSP as well as their regularity of supply as indicated in table 7 is a measure of the reduce burden on households in terms of time spent on water collection.

From table 5 above, it is revealed that 65.9% of households in Jimeta use the commercial outfit as an alternative to public water supply, while the aggregate usage of wells is 19.1%. This implies that without the commercial outfit, the usage of wells and other unsecured sources would have been 85% (investigating the quality of well water in Jimeta is outside the scope of this research) this could have had grave consequence for Jimeta urban development in terms of public health as it could have contributed to the prevalence of water borne diseases, because at shallow depths, wells constitute potential health hazards (Dada et al op cit).

4.4.3.2 Investment and Employment Opportunities:

The operational infrastructure of the SSSP provides an investment opportunity which will have a multiplier effect on the urban economy. The number of submersible boreholes rose from 5 boreholes in 2000 to 64 in 2005 (Abdul-Wahab, 2005). There are also twelve (12) commercial water tanks and about 1500 push carts. The total worth of the SSSP is estimate to be up to ₦300 million. In terms of employment, it generates employment to at least 1576 daily especially during the dry season (Field Survey, 2007), as compared to the total number of 198 Jimeta Water Board staff (Water Board 2004). This job opportunity created will lead to a reduction of poverty.

4.4.3.3 The Feasibility of Commercialising Public Water Supply:

Although Adamawa State Water Board is not on the profile of State Water Agencies that has taken reform initiatives towards Private Sector Participation as indicated by the Federal Republic of Nigeria NWSSISN (2000) and confirmed by

a field survey in 2007, the findings from this research on the pattern of expenditure on water purchase from the alternative sources of water supply table 10 reveals an average mean daily and monthly expenditure of ₦154.5 and ₦4635 respectively. When the average expenditure of Jimeta is compared with domestic flat rate tariff of ₦420 single tap connection and ₦700 full connection of Kano (Iliyas and Sani 2000) and an estimated tariff of ₦772.19 single tap connection and ₦1230.20 full connection from a households willingness to pay commercial tariff survey in Zaria (Ma'aruf, 2005), for Kaduna State Water Board on a reform initiative towards Private Sector Participation for an improved public water supply system (Kano and Zaria shares similar socio-economic characteristics with Jimeta), it can be seen that on a monthly basis households in Jimeta spends about six and three times the monthly tariff on a single tap and full connections respectively. That households are already spending more for less water is a demonstration of the capacity of households to sustain water supply on economic principle should the Adamawa State Water Board decides to embrace a reform initiative which is a sine qua non for the public- private partnership proposal of this research. This is tune with the National Water Supply Sanitation Policy 2000.

4.4.3.4 The Need for Legislation:

The need for legislation from the state house of assembly in consonance with the NWSSP 2000 that will recognise, regularise and institutionalise small scale water services provision as well as facilitate intermediation and partnership between the Water Board and the small scale service providers. This will set the

stage for an improved water supply system which has concomitant urban development benefits.

4.5 Summary

In this chapter, the data essential to this study have been presented, analyzed and discussed. The findings and what they means for the development of Jimeta were also discussed. The presentation of data and analysis were arranged in a such a way that data on the existing water supply situation from both the public and the private outfits in terms of access, availability and expenditure on water came first and then the operations of the small scale service providers in terms of the identified operational constraints and possible solutions to such constraints. Such constraints and solutions that enjoyed the agreement of the respondents were those considered as the main findings of the study.

CHAPTER FIVE

SUMMARY, CONCLUSION, PROPOSALS AND RECOMMENDATIONS

5.1 Introduction

This chapter contains the summary of the entire study and a brief outline of the specific contributions of this study to knowledge in the field of urban developmental studies, specifically as it relates to the complexities of urban water supply as it makes or mare urban development. It has also some general recommendations in respect of the findings of the study, areas recommended for further study and the conclusions to this research.

5.2 Summary of the Study

Water supply is central to improvements in so many aspects of human development, health, education, urban and rural development, development of industry, and general economic development and thus central to the government's primary mission of poverty reduction.

Jimeta, the headquarters of Yola North Local Government Area since its creation in 1996, is equally the administrative seat of the government of Adamawa state. This dual status has been responsible for its growth in population and physical development, as well as its increased water demand. This increased demand coupled with the operations and maintenance problems of the Water Board has created water supply inadequacies in the town. The Water Board is only able to meet an estimated (no metering of production and distribution) 35% of household's demand for water for an average of 9 days in a month with an

average of 2 hours supply duration. As a result, $\frac{2}{3}$ of households in Jimeta do not pay water bills which is nearly free at ₦50 per month per compound.

This circumstance has led to a spontaneous emergence of small scale commercial alternative sources. In Jimeta presently, this outfit meets only 25% of household's demand for water but with every day supply for an average of 15 hours duration except that households pay 3 times what they will ordinarily pay for the same service from the public outfit even if the tariff is on economic principle. It has been shown that dissatisfaction with these problems in the urban water supply sector has led to calls for drastic management and policy changes including partnering and outright privatisation of the services. In recognition of such concerns, the Federal Government of Nigeria has adopted the NWSSP (2000) which endorses private sector participation as well as commercialisation of water services. Yet, the capacity, contributions, inhibitions as well as the strategies of involving the private sector in the main stream urban water supply outfit have not been looked at. This is constituted the crux of this research.

The study has shown that the number of submersible boreholes rose from 5 boreholes in 2000 to 64 in 2005. There are also twelve (12) commercial water tanks and about 1500 push carts. The operational infrastructure of the SSSP is worth up to N300 million. In terms of employment, it generates employment to at least 1576 daily especially during the dry season as compared to the total number of 198 Jimeta Water Board staff.

It has been reported that, covering about 20% of the push cart vendors, 50% of the commercial boreholes, 83% of the water tank vendors and 67% of the

management staff in the state Ministry for Water Resources, the study collated information on the organisational and operational activities of the small scale water providers. It reveals that 100% and 90% of the water tank and push cart vendors do not own the business. Although 93% of the commercial borehole operators own their business, it was entirely through personal savings. In terms of their contributions, 600, 000 litres, 1, 986, 000 litres and 1,904, 640 litres is what is supplied daily by water tank vendors, push cart vendors and the commercial boreholes respectively. As regards to their relationship with the Water Board, it is only the water tank vendors that have the relationship of fetching water from a single point (hydrant) of the Water Board.

The study identified institutional arrangement, legal and policy, resource issues, and urban development policy issues as the key problems militating against small-scale service provision and expansion. An attempt was made to proffer solutions to the identified problems. This is embedded in the recommendations.

The study has reviewed some case studies of implementation of public private partnership in urban water supply in other developing countries. It is shown from the review that for such to be successful, apart from addressing the key problems militating against small scale service provision and expansion, internal management factors (organisational mission, values and objectives, autonomy, staffing, finance etc) and external influences (government policy, societal values etc), tariff structure, cost recovery and commercialization issues

etc. that has incapacitated the public water supply outfit needs to be addressed as well.

5.3 Basic Contributions of the Study

The basic contributions of this study to knowledge in urban developmental studies can be summarized in the following paragraphs:

The study empirically questioned the level of public and private sector participation in domestic water supply in Jimeta and has come out with the findings that, although the public water supply substructure is not inadequate for needs of the population, ineffective service has made it unreliable. This situation has made the use of alternative sources of water supply inevitable. Even though there are so many alternative sources both private and commercial, the commercial outfit which can not be compared with the public outfit in terms of infrastructure, efficient service delivery has made greater than 65% of households in Jimeta to rely on it.

It has questioned the prospects and urban development implications of a public-private partnership in urban water supply in Jimeta and came out with the findings that, although Adamawa State Water Board is not on the profile of State Water Agencies that has taken reform initiatives towards Private Sector Participation, the findings from this research on the pattern of expenditure on water purchase from the commercial sources of water supply reveals an average mean monthly expenditure of N4635. This is three times the monthly tariff on a full connection of a water utility on commercial basis. That households are already spending more for less water is a demonstration of the capacity of

households to sustain water supply on economic principle should the Adamawa State Water Board decides to embrace a reform initiative which is a sine qua non for the public- private partnership. This will bring about improve access to portable water with attendant positive health externalities, as well as investment and employment opportunities; thereby reducing poverty by reducing time and money spent on procuring water as well as the wealth that will be created by the investment and job opportunities.

It has empirically identified several problems militating against effective small scale water provision in Jimeta and advanced different solutions to the identified problems. This is hinged on the need for legislation that will recognise, regularise and institutionalise small scale service provision as well as frame works that will facilitate intermediation, coordination and partnership between the Water Board and the small scale service providers.

5.4 Proposals

1. The Jimeta water Board can work with the intermediate service providers (carriers and tankers) to improve service, Figure 5. Water vending is a common practice all over Nigeria as there is hardly any town that is free of water carters, manual or motorised. Utilities in Mauritania have adopted their services to facilitate or directly promote this mode of distribution down stream of their network (Water Utility Partnership, 2003). Although this may be seen as a temporary solution until extensions are installed, the case in Jimeta is more than that of network coverage because except for some part of Demsawo Ward (i.e Jambutu and Damilu), all other wards are fully covered by the water network, yet

the supply is for an average of 9 days in a month for an average of two hours in a day.

Again it may be argued that once the internal management factors (organisational mission, values and objectives, autonomy, staffing, finance etc) and external influences (government policy, societal values etc), tariff structure, cost recovery and commercialization issues etc. that has incapacitated the public water supply outfit are addressed the partnership will cease to be useful, on the contrary it will sustain access to water of safe quality for the low income who may not afford an in house connection due to cost as well as reduce pressure on the piped system.

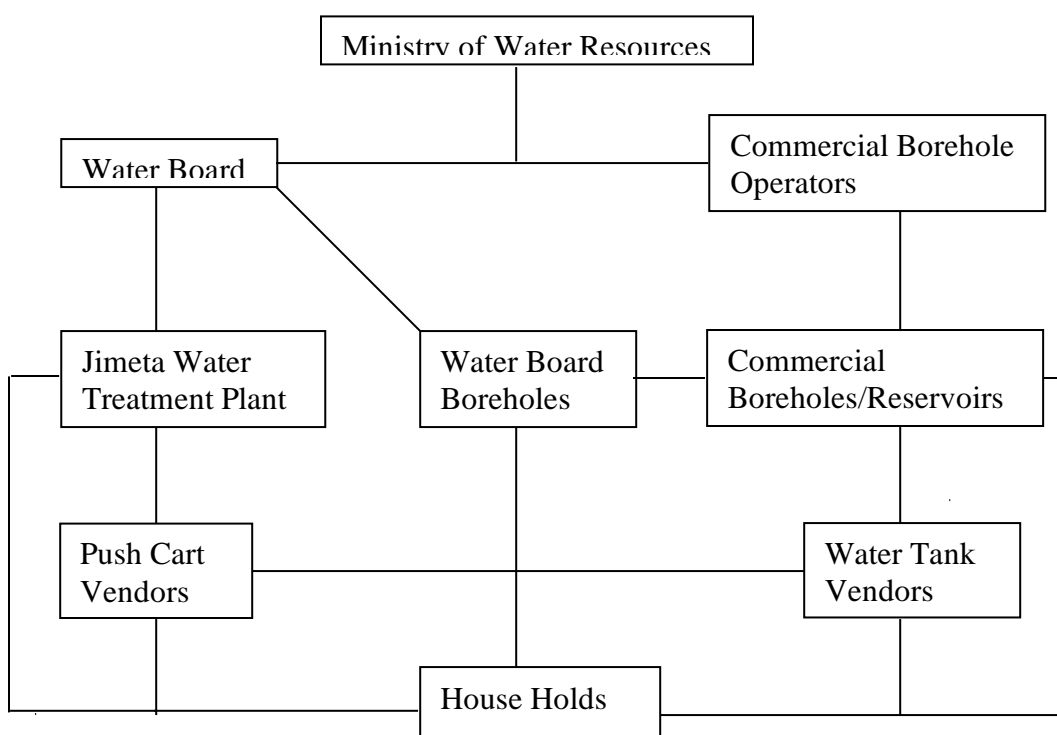
The Water Board can in addition to their 44 boreholes scattered all over Jimeta and a single tanker filling station (A.k.a low level) setup large-flow water points and standpipes for carters to collect water for redistribution. This will have the effect of reducing the distance from the point to the house and thus the price of water supplied. Water vending kiosk, selling water by jerry-can can as well represent the main water supply system in a form of partnership. To achieve this, the Water Board should support the creation of associations. Each association should own and manage one filling point to which the Water Board should sell bulk water measured by a meter at a rate to be agreed by the two parties.

2. Independent water service providers invest huge amount of money in and operate water supply infrastructure in form of submersible boreholes. The cost of, initial investment and operation and maintenance (especially powering) coupled with low economies of scale makes the unit cost of water expensive. On the

contrary, especially within the public water supply system coverage, specially installed large flow hydrants that can supply metered bulk water to the storage facilities of the entrepreneurs (Figure 5), this can take care of the exigencies of commercial bore hole operation there by reducing the cost of water and guaranteeing quality.

3. The Water board can also work with the independent service providers (commercial borehole owners) in lease contracts for Water Board boreholes, Figure 5.

Figure 5: THE PROPOSED RELATIONSHIP BETWEEN THE PARTNERS AS WELL AS THE SERVICE RECIPIENT



Source: Researcher (2007)

5.5 Recommendations

Based on the findings of this study, the following general recommendations are proffered:

a. The first step to bringing about a partnership between the public and the private water providers is for the public authorities to recognise the small scale water providers. Independent service provision is still seen as contrary to the long term interest and culture of utilities. The Water Supply and Sanitation good practice document from Sub-Saharan Africa compiled by Water Utility Partnership (2003) identified three reasons for that. First, it draws attention to the deficiencies of utilities, secondly, it introduces competition into an environment that operates or is perceived as a monopoly and thirdly it recognises and perhaps enables a private entity with a profit motive to deliver that which is often considered to be a public service and a social good. However, many authorities and utilities in other developing countries like Nigeria have realized that the main reason for the growth in the alternative service market is their own failure to deliver an adequate public service. They have acknowledged that their continued ignorance about the nature and potential of these providers and the lack of recognition of these services, work against the very consumers they aim to serve. As a result, substantial number of municipalities and utilities in Zambia, Ethiopia and Tanzania are now supporting independent water supply arrangements within their area of service (Water Utility Partnership, 2003). The NWSSP 2000 endorsement of private sector participation and commercialisation of water supply services is a step in the right direction.

- b. The public authorities should establish a regulatory framework at the state level which outlines the modalities and approaches for different forms of private sector participation. This should be based on a support to build and strengthen capacities of the private sector to participate in water supply services and in utility management.
- c. The federal government in line with its NWSSP 2000, which endorses private sector participation and commercialisation of water supply services, should create the enabling environment to ensure commercial access to finance for the private sector.
- d. The activities of the National Agency for Food Drug Administration and Control (NAFDAC), Urban Planning and Development Authority (UPDA), Ministry of Commerce, Board of Internal Revenue, Local Government etc. in respect of taxes and revenue needs to be streamlined to reduce the financial burden on the small-scale service providers as an incentive.
- e. The Poverty alleviation programme, the National Directorate of Employment, the Small and Medium Enterprises etc should come to the aid of SSSP by given them special attention and consideration.

5.6 Conclusion

In Jimeta, the result of the study shows that partnership between the public and the private water supply outfits is feasible based on the already existing relationship between the Water board and the water tank vendors as well as willingness on both sides to engage each other, but for it to be successful, apart from addressing the key problems militating against small scale service provision

and expansion, internal management factors and external influences that has incapacitated the public water supply outfit needs to be addressed as well.

5.7 Recommendations for Further Research

The following areas of research are proposed for further research work:

- (a). A comparative study of small-scale water supply outfits with public water supply outfits in selected urban centres.
- (b). Planning implications of the location of commercial water supply substructure in our urban centres.
- (c). An analysis of the contribution of push cart water vendors to urban township road accidents

REFERENCES

- Abdullahi, B.M. (2001): Planning and design Proposal for Improve Water Supply and Distribution System in Ajiya Ward of Yola-north. B. Tech URP Thesis. Federal University of Technology, Yola.
- Abdul-Wahab, S. (2006): Private Sector Participation in Urban Domestic Water Provision in Jimeta: Contributions and Pitfalls; A Seminar paper Presented at the Department of Urban and Regional Planning, Federal University of Technology, Yola. 14th February.
- Adamawa State Ministry for Environment (2003): Towards an Efficient and Sustainable Infrastructure and Utilities Services in Nigeria, Paper Presented at a seminar organised by the Department of Urban and Regional Planning, Federal University of Technology, Yola. 7th October.
- Adamawa State Water Board (2004): December Monthly Report, Jimeta District Office, Yola.pp.4, 7, 10, 17.
- Adebayo, A.A. (1991): Climate in Adebayo, A.A and Tukur, A.L, (eds) Adamawa State in Maps, Paraclete Publishers Yola.pp.20-23
- Adewale, A.N. (2001): Partnership in Urban Facilities Management: A case Study of Water Supply in Minna. B.Tech. URP Thesis. Federal University of Technology, Minna.
- Agunwamba, J.C. (1993): Poverty, Sustainable Development and Environmental Technology. Proceedings of Nigerian Society of Engineers, Kaduna. December.pp.90-108.

- Agunwamba, J.C. (1995): Rural Water Supply: Success and Failures in Eboh, E.C. Anyichi, D. Okoye, C.U. (eds). Rural development in Nigeria: Concepts, Processes and Prospects, Auto-Century Publishing Company, Enugu.pp.103-118.
- Agunwamba, J.C. (2000): Water Engineering Systems. Immaculate Publications Limited, Enugu.pp.17, 33-36, 44-48.
- Akintola, F.O. and Areola, O. (1980): Domestic Water Consumption in Urban Areas. A case Study in Ibadan city, Nigeria. Water Supply and Management 4: 321-313.
- Akosim, C. Tella, I.O, Jatau, D.F. (1999): Vegetation and Forest Resources in Adebayo, A.A and Tukur, A.L, (eds) Adamawa State in Maps, Paraclete Publishers Yola.pp.32-35.
- Aliyu, A.W. (2004): Household Water Supply in Yola-north, Problems and Prospects. B. Tech URP Thesis. Federal University of Technology, Yola.
- Amos, G.M. (2005): The Role of Community-Based Organisations in Infrastructure Development in Yola-north Local Government Area, Adamawa State. MURP Thesis. Federal University of Technology, Yola.
- Arrais, S. (1996): The Condominial Sewerage System in Recife. Best Practices, UNCHS (Habitat) 1996, Nairobi, Kenya.pp.109-119.
- Ayode, J.O. (1981): Institutional Development- Case Study of Water Corporation of Oyo State, Nigeria. WECD, Loubourough University of Technology, Unpublished M.Sc. Thesis.

- Bashir, A. (1999): Educational and Health Services Infrastructure in Adebayo, A.A. and Tukur, A.L, (eds) Adamawa State in Maps, Paraclete Publishers Yola.pp.75-84.
- Bloxom, W.R. (1996): Financing Local Community Projects in the Sustainable Ibadan Project. Discussion Papers No.1 Prepared by (UNCHS) Chief Technical Adviser, Sustainable Ibadan Project. January.
- Cecilia, B.G, Antonia, E and Nemat, S. (2004): Infrastructure Services in Developing Countries: Access, Quality, Cost and Policy Reforms. World Bank Policy Research Working Paper 3468.pp.28.
- Charles, S. (2005): Why Water Must Not Fail into Private Hands. Aliran Monthly, Vol. 25. Issue 1.July 2005.pp.2,3,5.
- Dillinger, W. (1994): Decentralisation and its Implication for Urban Services Delivery. Policy framework Paper no.16. Nairobi, UNDP / UNCHS / World Bank: Urban management Programme, 1994.
- Duru, J.O. (1991): Towards a Successful Water Supply Programme for Nigeria. Proceedings of Conference on Engineering for Accelerated Rural Development. Nsukka.pp.272-277.
- Falana, E.O. (1991): On Water Availability and Demand in Nigeria. Water Supply and Management 5(4/5): 361-372.
- Federal Republic of Nigeria (2000): National Water Supply and Sanitation Policy (NWSSP), Federal Ministry for Water Resources.pp.1-23.
- Federal Republic of Nigeria (2000): Water Supply and Sanitation Interim Strategy Note (WSSISN).pp. iii, 3, 4, 6&14.

- Franceys, R. (1994): Management of Water Utilities in Low-income Countries. India and Uganda. Institutional Development Series, WEDC, Loughborough University of Technology.
- Galtima, M. (1999): Transportation in Adebayo, A.A and Tukur, A.L, (eds) Adamawa State in Maps, Paraclete Publishers Yola.pp.59-62.
- Government of the Netherlands (1994): Implementing UNCED Agenda 21: Ministerial Conference on Drinking Water and Environmental Sanitation, 22-23 March. Noordwijk, the Netherlands.
- Habitat Debate 9(3) (2003): Water and Sanitation for Cities. UN-Habitat, September 2003. pp14.
- Hussaini, B.A. (2006): Private Participation in Water Infrastructure Provision in Jambutu ward of Jimeta, Yola-north: Implications for Planning; A Seminar paper Presented in the Department of Urban and Regional Planning, Federal University of Technology, Yola.14th February 2006.
- Idachaba, (1982): Water Supply Sources in Nigeria: National Water Bulletin Vol.2 No.3.July.pp.10-28.
- Ishaku, H.T (2006): Planning for Sustainable Water Supply through Partnership Approach in Wukari Town, Taraba State. M. Tech URP Thesis. Federal University of Technology, Yola. pp.40
- Lee, S.K. and Anas, A. (1992): Cost of Deficient Infrastructure: The Case of Nigerian Manufacturing Industries. Urban studies 29(7):pp.1071-1092.

- Libby, W. (2000): Private Participation in the Water Sector. International Institute for Environment and Development (IIED), Environmental Economics Programme, Discussion Paper 99.
- Ma'aruf, S. (2002): Analysis of the Willingness to Pay Commercial Tariff for Public water Supply in Zaria and its Implications on Urban Development; Doctoral Research Proposal, ABU Zaria. October 2002. pp 1-19.
- Ma'aruf, S. (2003): Access to Public Water Supply and Willingness to Pay Commercial Tariff in Zaria Pilot Survey Findings; Doctoral Research Seminar, ABU Zaria. August 2005. pp 1-29.
- Ma'aruf, S. (2005): Prospects and Urban Development Implications of Commercialisation in Water Supply: Case Study of Zaria; Doctoral Research Seminar, ABU Zaria. June 2003. pp 1-40.
- Magaji, A.A. (1990): Water for Sustainable Development. Paper Presented at, Water 90 Workshop on The Role of National Development, National Water Research Institute Kaduna, 5th-9th November.
- Mohammed, K. (1999): Historical Background in Adebayo, A.A. and Tukur, A.L, (eds) Adamawa State in Maps, Paraclete Publishers Yola.pp.7
- Muhammed, M.R. and Olli, V. (2005): Integrated Water Resources Management: Evolution, Prospects and Future Challenges. Water Resources Laboratory, Helsinki University of Technology, Finland.pp.3, 5.
- Naphtali, G. (2000): Problems of Water Supply in Jimeta Metropolis. B.Tech. URP Thesis. Federal University of Technology, Yola.

- Nwagboso, N.K. and Uyanga, J. (1999): Population in Adebayo, A.A and Tukur, A.L, (eds) Adamawa State in Maps, Paraclete Publishers Yola.pp.92-95.
- Odekunle, M.R (2005): Academic Research; Developing Skills in Project Writing, RECH Publishing House Yola. pp.68-91.
- Penelope, J.B. (1999): The Global Privatization of Water: Urban Age, Winter 1999.
- Ray, H.H. (1999): Soil and Erosion in Adebayo, A.A. and Tukur, A.L, (eds) Adamawa State in Maps, Paraclete Publishers Yola.pp.7
- Rwiter, W. and Sanders, F.M. (1999): Physical Planning, Department of Infrastructure, Faculty of Engineering, University of Technology, the Netherlands.pp.225-234.
- Sadiq Y.I (2004) Planning Strategies for an adequate Water Distribution Network in Jimeta-Yola. B.Tech. URP Thesis. Federal University of Technology, Yola. Pages 13, 24 and 30.
- Shebeler, P. (1995): Urban Sanitation: The challenge to Communities, Private Sector actors, Local Governments, and external support agencies. Introduction to Aguasan workshop,Gersan, Switzerland, 26-30 June.
- Suresh, V. (2005): Strategies for Sustainable Water Supply for All: Indian Experience.pp.1-9.
- Swyngedouw, E.A. (1995): The Contradictions of Urban Water Provision- A study of Guayaquil, Ecuado. Third World Planning Review 17(4).pp.387-405.
- The United Nations World Water Development Report (2000): The Worlds Water Crises.pp.8
- The Urban Age 2(4) (1994): Privatization and Cities. The World Bank, Washington DC.

- Timothy F.A. (1998): Financing Water Infrastructure Projects in Smaller Cities of Developing World: Recent Trends; Research Paper, UNDP / Yale Collaborative Programme, 1998 Research Clinic, New Haven.pp. 17-28.
- Tova, M.S. (1998): Competition in Water and Sanitation: The Role of Small-Scale Entrepreneurs. Public Policy for the Private Sector Note No.165. The World Bank Group.pp.1-4.
- Tukur, A.L. (1999): Land Forms in Adebayo, A.A and Tukur, A.L, (eds) Adamawa State in Maps, Paraclete Publishers Yola.pp.14-16
- UNCHS (1998): Community Development Library; Urban Indicators Tool Kit. A guide to Istanbul.pp.14
- USAID (2001): Urban Water Supply and Distribution. Making Cities Work Home Page. www.makingcitieswork.org.pp.1-5.
- Uyanga, J. (1999): Adamawa State in Mamman A.B. Oyebanji, J.O. and Peters, S.W. (eds) Nigeria, Survey of States, Gabumo Publishing Co. Ltd Calabar.pp.17-28.
- WCED (World Commission on Environment and Development) (1987): Our Future: Oxford University Press.pp.46.
- Wegelin, M. (1995): Framework for Infrastructure Development in Urban Low-income Areas. The Hague, the Netherlands, IRC, October 1995.
- Wegelin, M. (1999): Water Demand and the Poor: A Paper Presented at, International Symposium on “Efficient Water Use in Urban Areas- Innovative Ways of Finding Water for Cities,” Kobe, Japan.1999.pp.2
- William G. C. (1977): Sampling Techniques. John Wiley and Sons, Inc.

World Bank, (1994): World Development Report. The World Bank, Hill Park, Upper Hill; Nairobi-Kenya.

World Bank (2002) WSP-AF (Water and Sanitation Programme-Africa Region): (Field Note 12) Water Services in Small Towns in Africa; The Role of Small and Medium-Sized Organisations. The World Bank, Hill Park, Upper Hill; Nairobi-Kenya.pp.1-7

APPENDIX I

QUESTIONNAIRE FOR JIMETA RESIDENTS

FEDERAL UNIVERSITY OF TECHNOLOGY, YOLA.

DEPARTMENT OF URBAN AND REGIONAL PLANNING

Jimeta Household survey Questionnaire

Dear Sir/Madam,

Please, your assistance is being sought to provide answers to the issues raised in this questionnaire. The information is to enable us undertake a survey on household and housing characteristics as well as their water supply situation. Your views will be treated in confidence as this research is primarily for academic purpose.

Thank You.

Yours Sincerely

Abdul-Wahab SHUAIBU

SECTION A

Household and Housing characteristics

Kindly fill in the blank spaces with appropriate answers and tick [] the appropriate options were applicable.

1. Ward of Respondent.....

2. Sex (a) Male [] (b) Female []

3. Marital Status (a) Married (b) Single (c) divorced (d) Widow

4. Age Bracket (a) 18-25 (b) 26-30 (c) 30-35 (d) 36-40 (e) 41-45

(f) 46-50 (g) 51 and Above

5. Educational Status (a) Primary (b) Secondary (c) Tertiary

(d) Informal (e) Illiterate

6. Occupational Status (a) Civil Servant (b) Business (c) Faming

(d) Student (e) Retired (f) Unemployed

7. Income (a) <10,000 (b) 10-15,000 (c) 16-20,000

(d) 21-25,000 (e) 26-30,000 (f) >30,000

8. Household Size (a) <5 (b) 5-9 (c) 10-14 (d) 15-19

(e) 20 and Above

9. Housing Type (a) Rooming Apartment (b) 1 Bed room Flat

(c) 2 Bed room Flat (d) 3 Bed room Flat

(e) 4 Bed room Flat

10. Housing Tenure (a) Land Lord (b) Tenant

11. Duration of Stay (a) <5yrs (b) 5-10yrs (c) 11-15yrs

(d) 16-20yrs (e) 20 and Above.

SECTION B

Water Supply Situation

Kindly fill in the blank spaces with appropriate answers and tick [] the appropriate options were applicable.

1. Do you have pipe-borne water connection? (a) Yes (b) No

2. If yes, is it active? (a) Yes (b) No
3. What is your alternative source of water? (a) Private well
- (b) Public well (c) Neighbourhood well
- (d) Private borehole (e) Public borehole
- (f) Commercial borehole (g) Public standpipe
- (h) Rain harvest (i) Streams (j) Water tanker
- (k) Push cart (l) River
4. If your connection is not active, is it as a result of non payments of bills?
(a) Yes (b) No
5. Do you pay monthly bills? (a) Yes (b) No
6. If yes how much (a) #50 (b) #100 (c) #150 (d) #200 (e) #300
- (f) #400 (g) others Specify.....
7. How often do you get water from the tap? (a) Daily (b) Twice a week
- (c) Three times a week (d) Once a week
- (e) Never (f) Irregularly but averagely after.....days.
8. How many hours do the tap runs? (a) 1hr (b) 2hrs (c) 3hrs
- (d) 4hrs (e) 5hrs
9. How much do you spent on alternative source of water daily? (a) #50
- (b)#100 (c) #150 (e) #200 (f) #200 and above
10. Indicate your level of satisfaction with the level of service and value for
money provided by the Water Board. (a)Very good (b) Good (c) average (d)
Poor (e) Very poor
11. .Indicate your level of satisfaction with the level of service and value for

money provided by the Small Scale Providers. (a) Very good (b) Good (c)
average (d) Poor (e) Very poor

APPENDIX II**QUESTIONNAIRE FOR THE STATE WATER BOARD****(BOREHOLE OPERATIONS)****FEDERAL UNIVERSITY OF TECHNOLOGY, YOLA.****DEPARTMENT OF URBAN AND REGIONAL PLANNING****Survey of Public Sector Engagement of the Private Sector in Urban Domestic Water****Supply in Jimeta-Yola, Adamawa State**

Dear Sir/Madam,

Please, your assistance is being sought to provide answers to the issues raised in this questionnaire. The information is to enable us undertake a survey on Public Sector Participation in Urban Domestic Water Supply in Jimeta. Your views will be treated in confidence as this research is primarily for academic purpose.

Thank You.

Yours Sincerely

Abdul-Wahab SHUAIBU

Engagement of the Private Sector in Water Distribution by the Jimeta Water Board

Kindly fill in the blank spaces with appropriate answers and tick [] the appropriate options were applicable.

1. Do you sell water to water vendors? (a) Yes [] (b) No []

2. If yes, what type? (a) Push cart (b) Water tankers (c) All of the above

3. How much is a push cart? (a) #60 (b) #80 (c) #90 (d) #120 (e) #180

4. How many push carts are sold per day during the rainy season? (a) 50
(b) 100 (c) 150 (d) 200 (e) 300

How many push carts are sold per day during the dry season? (a) 100
(b) 200 (c) 3000 (d) 400 (e) 500

5. How much is a tanker? (a) #2000 (b) #2500 (c) #3000 (d) #3500
(e) #4000 (f) #4500 (g) #5000

6. How many tankers are sold per day during the rainy season? (a) 5
(b) 10 (c) 15 (d) 20 (e) 30 (f) 35 .

7. How many tankers are sold per day during the dry season? (a) 10
(b) 15 (c) 20 (d) 25 (e) 30 (f) 35

8. Is demand increasing or decreasing over the past five years?
(a) Increasing (b) Decreasing

9. How would you want to engage the private sectors in partnership with your Organisation? (a) Standpipe operator (b) Lease contract for water board boreholes (c) Vendor (tanker) (d) Vendor (push cart) (e) All of the above

10. Will the partnership be effective? Yes No

11. If no, why.....
.....
.....

12. Kindly make your comments, suggestions or observations on any or all
of the issues raised above. Additional sheets could be attached.....

.....

.....

.....

APPENDIX IIIa**QUESTIONNAIRE FOR SMALL-SCALE WATER SUPPLIERS****FEDERAL UNIVERSITY OF TECHNOLOGY, YOLA.****DEPARTMENT OF URBAN AND REGIONAL PLANNING****Survey of Private Sector Participation in Urban Domestic Water Supply in Jimeta-
Yola, Adamawa State**

Dear Sir/Madam,

Please, your assistance is being sought to provide answers to the issues raised in this questionnaire. The information is to enable us undertake a survey on private sector participation in urban domestic water supply in Jimeta. Your views will be treated in confidence as this research is primarily for academic purpose.

Thank You.

Yours Sincerely

Abdul-Wahab SHUAIBU

SECTION A**Contribution of the Private Sector in Urban Domestic Water Supply in Jimeta-Yola,
Adamawa State**

Kindly fill in the blank spaces with appropriate answers and tick [] the appropriate options were applicable.

Business Name.....

Address.....

Ward

1. Status (a) Independent (b) Intermediate

Production Capacity (if independent).....

Type of borehole (if independent).....

2. Source of entry finance? (a) Personal savings (b) Family savings (c)

Bank loan

3. Do you have a distribution outfit? (a) Yes (b) No

If yes what type? (a) Push carts (b) Water tankers (c) Piped network

(d) All of the above

4. What is the average number of push (12 jerry cans) sold a day?.....

How much is a truck? (a) #60 (b) #80 (c) #90 (d) #120

(e) #180

What is the average number of water tankers (10,000 lit)sold a day?...

How much is a tanker? (a) #2000 (b) #2500 (c) #3000 (c) #3500

(d) #4000 (e) #4500 (f) #5000

5. Do you belong to any association? (a) Yes (a) No

If yes, what is the name and how many are you in the association?.....

6. Are you into any savings club? (a) Yes (b) No

7. What kind of relationship do you have with the Water Board?

(a) Standpipe operator (b) lease contract for water

board boreholes (c) Vendor (tanker) (d) Vendor (push cart)

(e) None

8. How would you want to be engaged in a partnership by the Water

Board? (a) Standpipe operator (b) lease contract for water

board boreholes (c) Vendor (tanker) (d) Vendor (push cart)

SECTION B

Constraints to Effective Participation

Tick the option [] that satisfy your opinion

(a) Strongly agree [5] (b) Agree [4] (c) Undecided [3] (d) Disagree [2]

(e) Strongly disagree [1]

Statements

[5] [4] [3] [2] [1]

1. Pubic authorities are not familiar with the workings

off small-scale service providers and generally

under estimate the importance of their activities.

2. There is lack of targeted financing from govt.

3. There is lack of framework for including funding

from donor agencies and philanthropists.

4. There are no incentives and credit enhancement

for the small-scale service providers from commercial

banks

5. The activities of the regulatory outfits of the private

water providers are not stream lined, as such, multiple

taxes and revenues are collected from the

water providers.

SECTION C

Possible Solutions for Effective Participation

Statements

1. The first step to improving service offered by small-scale service providers is for public authorities to recognise their role.
2. The public authorities should establish a regulatory framework which is based on a supportive and consultative relationship between service providers and authorities responsible for water supply oversight.
3. Multinational organisations such as the European Union (EU) engaged in co-funding water supply projects at local government/community level can extend such gesture to small-scale suppliers .
4. The Federal Government in line with its national water supply and sanitation policy 2000, which endorses private sector participation and commercialisation of water supply should create the enabling environment for accessing funds as is obtainable with other fundamental requirements for living such as housing.
5. The activities of the National Agency for Food Drug Administration and Control (NAFDAC),

Urban Planning and Development Authority

(UPDA), Ministry of Commerce, Board of

Internal Revenue, Local Government etc. in

respect of taxes and revenue needs to be stream

lined to reduce the financial burden on the small-

scale service providers as an incentive.

6. Kindly make your comments, suggestions or observations on any or all of the issues raised above. Additional sheets could be attached.....

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APPENDIX IIIb
QUESTIONNAIRE FOR PUBLIC AUTHORITIES
FEDERAL UNIVERSITY OF TECHNOLOGY, YOLA.
DEPARTMENT OF URBAN AND REGIONAL PLANNING

Dear Sir/Madam,

Please, your assistance is being sought to provide answers to the issues raised in this questionnaire. The information is to enable us undertake a survey on the activities of public and private water providers and how they can compliment each other. In a study of ten African countries Collignon and Vezina (2000) has found out that, over the last ten years, decentralisation has been at the heart of political debate, and the practice of delegation of responsibility for public services has been spreading. Supporting small-scale water services provision is thus perfectly in tune with current institutional and economic trends in Africa, and it does not imply a choice between city-wide entities and independent operators but that these two kinds of providers can compliment each other. Your views will be treated in confidence as this research is primarily for academic purpose.

Thank You.

Yours Sincerely

Abdul-Wahab SHUAIBU

Below are constraints and possible solutions to effective small-scale service provision and expansion. Tick the option [√] that satisfies your opinion.

SECTION A

Constraints to Effective Small-scale Service Provision and Expansion

Constraints to Effective Participation

Tick the option [√] that satisfy your opinion

(a) Strongly agree [5] (b) Agree [4] (c) Undecided [3] (d) Disagree [2]

(e) Strongly disagree [1]

Statements

[5] [4] [3] [2] [1]

1. Pubic authorities are not familiar with the workings

off small-scale service providers and generally

under estimate the importance of their activities.

2. There is lack of targeted financing from govt.

3. There is lack of framework for including funding

from donor agencies and philanthropists.

4. There are no incentives and credit enhancement

for the small-scale service providers from commercial

banks

5. The activities of the regulatory outfits of the private

water providers are not stream lined, as such, multiple

taxes and revenues are collected from the

water providers.

SECTION B

Possible Solutions for Effective Small-scale Service Provision and Expansion

Statements

[5] [4] [3] [2] [1]

1. The first step to improving service offered by small-scale service providers is for public authorities to recognise their role.

2. Public authorities should establish a regulatory framework which is based on a supportive and consultative relationship between service providers and authorities responsible for water supply oversight.

3. Multinational organisations such as the European Union (EU) engage in co-funding water supply projects at local government/community level can extend such gesture to small-scale suppliers.

4. The Federal Government in line with its national water supply and sanitation policy 2000, which endorses private sector participation and commercialisation of water supply should create the enabling environment for accessing funds as is obtainable with other fundamental requirements for

living such as housing.

5. Professional development among independent operators should be encouraged by recognising their associations as representative interlocutors.

6. Kindly make your comments, suggestions or observations on any or all of the issues raised above. Additional sheets could be attached.....

.....

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APPENDIX IV

Table for Determining Sample Size S from a Given Finite Population Size N When d is 0.05 with 0.95 Level of Significance

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354

...
...
...	27071	379

Source: Odekunle, (2005)

Appendix V

JIMETA TOWNSHIP STREET GUIDE SHOWING WARDS BOUNDRIES

SOURCE: ASMLS Yola, (2007)

Appendix VI

**ADAMAWA STATE WATER BOARD, JIMETA EXISTING DISTRIBUTION
NETWORK**

SOURCE: ASWB Yola, (2007)